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Timber Resource of Michigan's Western Upper Peninsula, 1980

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Information contained in this report includes the most commonly used Resources Evaluation statistics. However, additional forest resource data can be provided to interested users. Persons requesting additional information that can be provided from the raw inventory data are expected to pay for the retrieval costs. These costs will vary depending on the complexity of the request, from less than $100 for a relatively simple request to $2,000 for a complex retrieval involving the services of a Resources Evaluation computer programmer. If requests for data conflict with ongoing Resources Evaluation work, requests will be scheduled so as to minimize the impact on the work unit.

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FOREWORD

Resources Evaluation (formerly called Forest Survey) is a continuing endeavor as mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974, which was preceded by the McSweeney-McNary Forest Research Act of 1928. Its objective is to periodically inventory the Nation's forest land to determine its extent, condition, and volume of timber, growth, and depletions. This kind of up-to-date information is essential to frame intelligent forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for Resources Evaluation work done in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, eastern South Dakota, and Wisconsin.

Fieldwork for the 1980 Western Upper Peninsula forest inventory was begun in October 1977 and was completed in December 1979. Reports on the three previous surveys of Michigan's timber resource are dated 1935, 1955, and 1966.

Similar Resource Bulletins reporting statistical highlights and detailed tables on the other Survey Units in Michigan (see cover) are or soon will be available. In addition to these statistical reports, a series of reports will be published that will analyze the State's timber resource.

More accurate survey information was obtained during the 1980 survey than otherwise would have been feasible because of intensified field sampling. Such sampling was made possible by additional funding and manpower provided the North Central Station through the Michigan Department of Natural Resources and by interested forest industry members. Data from the Department's canvass of all primary wood-using plants in the State were used to help estimate the quantity of timber products harvested in Michigan.

Aerial photos used in the Western Upper Peninsula Forest Inventory were furnished by the Michigan Department of Natural Resources and the Ottawa National Forest.

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TIMBER RESOURCE OF MICHIGAN'S WESTERN UPPER PENINSULA UNIT, 1980

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HIGHLIGHTS

Forest Area

- Forest land accounted for 4.9 million acres (88 percent of the Unit's land area) in 1980, compared to 5.2 million acres (93 percent) in 1966.
- Commercial forest land occupied 4.5 million acres (93 percent of the forest land) in 1980, compared to 4.9 million acres (95 percent) in 1966—an 8-percent decline.
- Productive-reserved forest land totaled 267 thousand acres in 1980, compared to 185 thousand acres in 1966. Additions since 1966 include the Sturgeon River and Sylvania RARE II areas and the McCormick and Sylvania tracts on the Ottawa National Forest, as well as State sharptail grouse management areas and waterfowl project areas.
- Marquette County contained the largest area of commercial forest in 1980 (970 thousand acres) as it did in 1966 (1,097 thousand acres).
- Nonindustrial private parties owned 1.7 million acres (38 percent of the commercial forest) in 1980, compared to 2.0 million acres (40 percent) in 1966.
- The maple-birch forest type continues to dominate the commercial forest, representing 52 percent of the total in 1980, compared to 45 percent in 1966.
- Forty-five percent of the privately owned commercial forest has been owned by its present owner 20 years or more.
- Poletimber stands occupied 46 percent of the commercial forest in 1980 as compared to 44 percent in 1966, although the area of this stand-size class declined slightly between surveys.
- Sawtimber stands—the area of which increased by 88 thousand acres between surveys—amounted to 36 percent of the commercial forest in 1980, compared to 32 percent in 1966.

Timber Volume

- The volume of growing stock in 1980 was 5.8 billion cubic feet, 22 percent greater than the 4.8 billion[1] in 1966, in spite of the 8-percent loss of commercial forest land between surveys.
- Sawtimber volume amounted to 15.2 billion board feet[2] in 1980.
- Hardwoods make up 70 percent of the growing-stock volume.
- Hard maple (1,405 million cubic feet), quaking aspen (643 million), and soft maple (629 million) contain the highest volumes, and together account for nearly half of the growing-stock volume.
- Twenty-two percent of the 8-county Survey Unit's growing-stock volume is in Marquette County.
- Average growing-stock volume per acre in 1980 was 1,277 cubic feet (16.2 cords), compared to 967 cubic feet (12.2 cords) in 1966.
- Thirty-two percent of the growing-stock volume is in stands aged 41 to 60 years.
- Two-thirds of the sawtimber volume is in grade 3 saw logs.
- The volume in cull trees (rough, rotten, and short-log cull) is 565 million cubic feet; salvable dead tree volume is 198 million cubic feet.

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[1]*Published 1966 volumes were adjusted by factors derived from 1980 volume equations to make volumes for the two inventories comparable.*

[2]*International ¼-inch rule.*

Stand Conditions

- Net annual growth on growing-stock trees was 195 million cubic feet in 1979, compared to 139 million in 1965.
- The net annual growth rate of growing stock was 3.4 percent of inventory in 1979, compared to 2.9 percent in 1965.
- Net growth averaged 43.0 cubic feet per acre in 1979—28.2 cubic feet per acre in 1965.
- Annual mortality of growing stock amounted to 48 million cubic feet (0.8 percent of inventory) in 1979, compared to 37 million (0.8 percent of inventory) in 1965.
- Disease accounted for 47 percent of the mortality in 1979—chiefly diseases of aspen and elm.
- Insects caused only 5 percent of softwood mortality in 1979. However, this proportion will rise as the effects of the spruce budworm epidemic, which began after the current survey, are felt.
- Seventy-six percent of the commercial area can grow trees 51 feet and taller at age 50, and 23 percent of the area can grow trees 71 feet and taller at the same age.
- Stands aged 50 years or less declined from 62 percent of the commercial area in 1966 to 40 percent in 1980.

Timber Use

- Timber removals from growing stock in 1979 amounted to 78 million cubic feet (1.4 percent of inventory), compared to 68 million cubic feet (1.4 percent of inventory) in 1965.
- Marquette County accounted for 21 percent of the 1979 removals, followed by Iron County (17 percent) and Ontonagon County (14 percent).
- The aspens made up 34 percent of the 1979 removals volume, although they account for only 13 percent of the growing-stock volume.
- Output of timber products totaled 75 million cubic feet in 1978, 61 percent of which was pulpwood.
- Wood residue from primary plants totaled 8.1 million cubic feet in 1978, of which 1.9 million were not used.

Biomass

- Live shrub biomass (including trees less than 1 inch d.b.h.) was highest in the tamarack forest type—5,800 pounds per acre (green weight) in 1980.
- Live tree biomass (trees greater than 1 inch d.b.h.) totaled 319 million green tons (an average of 70 tons per acre) in 1980.
- Highest yields of live tree biomass (green weight) are in the oak-hickory forest type (89 tons per acre), the white pine type (84 tons), the maple-birch type (83 tons), and the paper birch type (73 tons).

APPENDIX

ACCURACY OF SURVEY

Resources Evaluation information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors. These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the Western Upper Peninsula Unit in 1980, 5,785.0 million cubic feet, has a sampling error of ± 0.99 percent (± 57,271 thousand cubic feet). The growing-stock volume from a 100-percent inventory, then, would be expected to fall between 5,842.3 and 5,727.7 million cubic feet (5,785.0 ± 57.3), there being a one in three chance that this is not the case.

Sampling errors were calculated separately for National Forest land and other land because of the higher sampling intensity on other land. For example, the sampling error for growing-stock volume on land other than National Forest is ± 1.02 percent but for Ottawa National Forest land it is ± 2.81 percent.

The following tabulation shows the combined sampling errors for the 1980 Western Upper Peninsula Forest Inventory:

Item	Unit totals (Million cubic feet)	Sampling error (Percent)
Growing stock		
Volume	5,785.0	0.99
Growth	194.7	1.48
Removals	78.3	13.00
Sawtimber	(Million board feet)	
Volume	15,246.2	1.61
Growth	701.4	3.07
Removals	243.8	15.80
Commercial forest land	(Thousand acres)	
Area	4,529.6	0.36

As survey data are broken down into sections smaller than State or Survey Unit totals, the sampling error increases. The smaller the breakdown, the larger the sampling error. For example, the sampling error for growing-stock volume in a particular county is higher than that for total growing-stock volume in the Survey Unit (table 74 shows the sampling errors for estimates smaller than Unit totals).

SURVEY PROCEDURES

The major steps in the survey of the Western Upper Peninsula Unit were as follows:

1. A total of 22,458 1-acre points were systematically distributed across aerial photos of the entire Unit, except the Ottawa National Forest. These points were classified into land classes as shown below, to make a preliminary estimate of forest area. Next, a total of 19,077 of these points were stereoclassified as to forest type, stand-size class, and density. Finally, a total of 2,777 points were examined on the ground to correct the preliminary area estimate for errors in classification and for actual changes in land use since the photos were taken.

	Photo points		Ground plots visited
	Classified	Stereo-classified	
Forest land	18,899	18,899	2,339
Unproductive forest land	1	1	1
Nonforest land			
With trees	72	9	9
Without trees	2,600	0	325
Water	718	0	86
Questionable	168	168	17
Total	22,458	19,077	2,777

At each of the 2,296 commercial forest locations, variable-radius plots (basal area factor 37.5) were established at 10 points uniformly placed over the sample acre. Tree measurements made at these locations and at 179 plots established in 1966 and remeasured in 1980 were the basis for estimates of timber volume, growth, mortality, number of trees, and other forest classifications on land other than National Forest land. Estimates for National Forest land were based on 188 plots established in 1980 on commercial forest land on the Ottawa National Forest and on 3 plots remeasured in 1980 on commercial forest land on the Dukes Experimental Forest.

2. Growth and mortality on all commercial forest land were estimated using the Stand and Tree Evaluation and Modeling System (STEMS)[3] after the System was adjusted with factors derived from the remeasurement in 1979 of permanent sample plots in the Upper Peninsula that were established in 1965. STEMS is an individual tree-growth projection system that uses the following stand and tree characteristics to "grow" trees by updating tree diameter and tree status (live, dead, or cut): species, tree diameter, crown ratio, site index, basal area, and average stand diameter. These characteristics were used to produce growth and mortality rates that were adjusted based on ground conditions gained from remeasurement of plots and applied to trees on the tree list to yield an updated tree list. Local volume equations were applied to the original and updated tree lists to estimate volumes of growth and mortality.

3. Under an agreement with the Ottawa National Forest, North Central Station crews established 10-point variable radius plots on the Ottawa Forest at the same time they established other plots in the Western Upper Peninsula Survey Unit. The Ottawa National Forest provided the Station with the area of commercial forest land by forest type, stand-size class, and density for the Forest; and the Station computed all area and volume data in the same manner non-National Forest data were computed. Area and volume tables were approved by the Ottawa National Forest staff before publication.

4. Statistics on timber utilization during 1978 were obtained from mill surveys. The Michigan Department of Natural Resources canvassed resident sawmills, veneer mills, and other primary wood-using plants. The North Central Forest Experiment Station canvassed out-of-State sawmills, pulpmills, and veneer mills to determine their use of timber from Michigan. Fuelwood and fencepost output was based on a sample of public and private landowners to determine their production of fuelwood and fenceposts, and on a canvass of industrial and public timber owners. Estimates of primary mill residue used for fuelwood were obtained from the canvass of Michigan primary wood-using plants. Timber cut for products by ownership class was determined by a canvass of public and industrial timber owners. The portion of timber cut unaccounted for by the latter owners was grouped under "farmer and other owners."

5. A total of 2,239 felled trees on 123 active logging operations were measured throughout the State during 1977-1978 to develop wood utilization factors for converting timber products output to timber removals for saw logs and pulpwood. Factors for all other products were obtained during the 1964-1965 Michigan utilization study.

6. Field data were sent to St. Paul for compilation.

[3]*For more information on STEMS, see: Belcher, D. L.; Holdaway, M. R.; Brand, G. J. A description to STEMS: The stand and tree evaluation and modeling system. Gen. Tech. Rep. NC-79. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; (In prep.) p.*

COMPARING MICHIGAN'S FOURTH INVENTORY WITH THE THIRD INVENTORY

Data from new forest inventories are often compared with data from earlier inventories to determine trends in timber volumes. Changes in procedures and definitions between surveys make it necessary to adjust earlier survey data so that they are comparable to data from the new survey. A consistency check was made for each Forest Survey Unit in Michigan to ensure that the changes observed between inventories reflect actual changes in the resource and not changes in definitions or procedures.

In Michigan's Western Upper Peninsula Unit the only definitional or procedural change between the 1966 and 1980 inventories was in the volume equations used. The volume equations used in 1980 gave more accurate estimates of tree volume than those used in 1966. Therefore, the 1966 volumes were adjusted by factors derived from the 1980 volume equations to make them comparable to 1980 volumes.

A test was then made to ensure that it was possible to move from the adjusted 1966 volumes to the 1980 volumes, by means of Timber Resource Analysis System (TRAS), a Forest Service computer program for updating, backdating, and projecting timber volume, growth, mortality, and removals. Using the 1966 numbers of softwood and hardwood trees by 2-inch diameter class and applying 1980 cubic feet per tree and board foot-cubic foot ratios yields estimates of 1966 softwood and hardwood volumes that are comparable with 1980 volumes. Then, using growth rates, mortality rates, and removals rates for the period between the two surveys, TRAS moves the inventories through the period. The program prints out volumes by diameter class and softwoods and hardwoods for each year in the period. Thus,

inconsistencies in volume, growth, mortality, and removals can be identified and resolved. A small downward adjustment in the 1966 softwood growth rate was necessary to move smoothly from 1966 to 1980 Western Upper Peninsula values.

TRAS generates an estimate of what total removals had to be for the inventory to have changed as it did between surveys, given the volume, growth, and mortality inputs. Estimates for removals for products and for logging residues—two of the three components of total timber removals—are available from an independent utilization study. An estimate of "other" removals (see Definition of Terms in Appendix), the third component of total removals, is made by subtracting the first two removals components from the TRAS-generated total removals estimate. This estimate of "other" removals is compared with findings from remeasurement plots and new plots (stump counts and land use change) to check its validity. Total removals are "trend level removals" because the estimate of "other" removals is based on a removals trend line from 1966 to 1980.

In 1966 State Forest was a separate owner class and included only land on State Forests. Other forested State-owned land was included under the Other Public owner class. In 1980 the State owner class included all State lands. Therefore, a comparison of statistics on State land between 1966 and 1980 is not possible.

Some mining companies were called diversified forest industry in 1966 and classed under Forest Industry owner class. In 1980 these companies were classed under Miscellaneous Private Corporation owner class. Therefore, a comparison of statistics for Forest Industry owner between 1966 and 1980 is not possible.

LOG GRADE

In Michigan's Western Upper Peninsula the butt log of every sawtimber tree on every full permanent sample plot (5,374 trees) was graded for quality. Additionally, all of the logs in a smaller sample of trees throughout the State (2,239 trees) were graded. The volume yield by log grade for each tree in the latter sample was used to distribute the volume of trees in the former sample into log-grade classes. The resulting volumes by log-grade classes were expanded to provide an estimate for the entire Unit.

Logs were graded on the basis of external characteristics as indicators of quality. Hardwood species were graded according to "Hardwood Log Grades for Standard Lumber."[4] The best 12-foot section of the lowest 16-foot hardwood log, or the best 12-foot upper section if the butt log did not meet minimum log-grade standards, was graded as follows:

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[4]*Vaughn, C. L.; Wollin, A. C.; McDonald, K. A.; and Bulgrin, E. H. Hardwood log grades for standard lumber. Res. Pap. FPL-63. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory; 1966. 52 p.*

Forest Service standard grades for hardwood factory saw logs

Grading factors		Specifications							
		Log grade 1			Log grade 2				Log grade 3
Position in tree		Butts only	Butts and uppers		Butts and uppers				Butts and uppers
Scaling diameter, inches		[1]13-15	16-19	20+	[2]11+		12+		8+
Length without trim, feet			10+		10+	8-9	10-11	12+	8+
Required clear cuttings of each of three best faces[4]	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No Limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep and crook allowance	For logs with less than one-fourth of end in sound defects		15 percent			30 percent			50 percent
	For logs with more than one-fourth of end in sound defects		10 percent			20 percent			35 percent
Maximum scaling deduction			40 percent[5]			50 percent[6]			50 percent

[1]Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.
[2]Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.
[3]A clear cutting is a portion of a face, extending the width of the face, that is free of defects.
[4]A face is one-fourth of the surface of the log as divided lengthwise.
[5]Otherwise #1 logs with 41-60 percent deductions can be #2.
Otherwise #2 logs with 51-60 percent deductions can be #3.

Forest Service standard specifications for hardwood construction logs (tie and timber logs)[1]

Position in tree		Butt and upper
Min. diameter, small end		8 inches +
Min. length, without trim		8 feet
Clear cuttings		No requirements.
Sweep allowance, absolute		One-fourth of the diameter at the small end for each 8 feet of length.
Sound surface defects	Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of log diameter at point of occurrence.
	Whorled knots	Any number if sum of knot diameters above the callus does not exceed one-third of log diameter at point of occurrence.
	Holes	Any number provided none has a diameter over one-third of log diameter at point of occurrence, and none extends over 3 inches into included timber.[2]
Unsound surface defects		Same requirements as for sound defects if they extend into included timber.[2] No limit if they do not.
End defects	Sound	No requirements.
	Unsound	None allowed; log must be sound internally, but will admit one shake not to exceed one-fourth of the scaling diameter and will admit a longitudinal split not extending over 5 inches into the contained timber.

[1]These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, then it may be necessary to subdivide the class into grades.

[2]Included timber is always square, and dimension is judged from small end.

Softwood species were graded according to the following specifications on the following page.

Log Grades for Eastern White Pine

Log grade	Minimum size Diameter	Minimum size Length[1]	Sweep or crook allowance	Total cull allowance including sweep	Maximum weevil injury	Allowable knot size (inches)[2] on three best faces or minimum clearness on four faces
	Inches	*Feet*	*Percent*		*Number*	*Inches*
1	12 & 13	8-16	20	50	0	Four faces clear full length
	14+	10-16	20	50	0	Two faces clear full length, or four faces clear 50 percent length (6 feet min. length)[3]
2	6+	8-16	30	50	0	Sound knots 1.e.[4] D/6 and less than 3 inches[5] Unsound knots: 1.e. 1½ inches and for: butt, lots 1.e. D/12, upper logs 1.e.D/10, or four faces clear 50 percent of length
3	6+	8-16	40	50	8-foot logs 1 weevil 10-foot+ logs: 2 weevils	Sound knots 1.e.D/3 and less than 5 inches. Unsound knots 1.e. D/6 and less than 2½ inches.
4	6+	8-16	50	50	No limit	No limit

[1]Plus trim.
[2]Disregard all knots less than ½-inch diameter in all grades.
[3]The sum of the diameter of sound knots plus twice the sum of the diameter of unsound knots (in inches) is less than or equal to ½ of the diameter of the log (inches).
[4]1.e. means less than or equal to.
[5]D means d.i.b. of log at location of knot.

Log Grades for Jack Pine and Red Pine

Grade 1: logs with three or four clear faces.[5]

Grade 2: logs with one or two clear faces.

Grade 3: logs with no clear faces.

After the tentative log grade is established, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3. Net scale after deduction for defect must be at least 50 percent of the gross contents of the log.

1. *Sweep.* Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one-third the diameter inside bark at small end.

2. *Heart rot.* Degrade any tentative 1 or 2 log grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

[5]*A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than ½-inch in diameter, overgrown knots of any size, holes more than ¼-inch in diameter. Faces may be rotated to obtain the maximum number of clear ones.*

Log Grades for All Other Softwood Logs

Grade 1

1. Logs must be 16 inches in diameter or larger, 10 feet or longer, and with deduction for defect not more than 30 percent of gross scale.

2. Logs must be at least 75 percent clear on each of three faces.
3. All knots outside clear cutting must be sound and not more than 2½ inches in size.

Grade 2

1. Logs must be 12 inches in diameter or larger, 10 feet or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.
2. Logs must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Logs must be 6 inches in diameter or larger, 8 feet or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.

Note: (A) Diameters are diameter inside bark (d.i.b.) at small end of log.
(B) Percent clear refers to percent clear in one continuous section.

TREE SPECIES GROUPS IN MICHIGAN'S WESTERN UPPER PENINSULA UNIT[6]

SOFTWOODS
- Eastern white pine .... *Pinus strobus*
- Red pine ..... *Pinus resinosa*
- Jack pine ..... *Pinus banksiana*
- White spruce ..... *Picea glauca*
- Black spruce ..... *Picea mariana*
- Balsam fir ..... *Abies balsamea*
- Eastern hemlock ..... *Tsuga canadensis*
- Tamarack ..... *Larix laricina*
- Northern white-cedar .. *Thuja occidentalis*

OTHER SOFTWOODS
- Eastern redcedar ..... *Juniperus virginiana*
- Norway spruce ..... *Picea abies*

HARDWOODS
- White oaks
  - Bur oak ..... *Quercus macrocarpa*
- Select red oak
  - Northern red oak .... *Quercus rubra*
- Yellow birch ..... *Betula alleghaniensis*
- Hard maples
  - Sugar maple ..... *Acer saccharum*
  - Black maple ..... *Acer nigrum*
- Soft maples
  - Red maple ..... *Acer rubrum*
  - Silver maple ..... *Acer saccharinum*
- American beech ..... *Fagus grandifolia*
- Ashes
  - White ash ..... *Fraxinus americana*
  - Black ash ..... *Fraxinus nigra*
  - Green ash ..... *Fraxinus pennsylvanica*
- Balsam poplar ..... *Populus balsamifera*
- Eastern cottonwood .... *Populus deltoides*
- Aspens
  - Bigtooth aspen ..... *Populus grandidentata*
  - Quaking aspen ..... *Populus tremuloides*
- Basswood ..... *Tilia americana*
- Black cherry ..... *Prunus serotina*
- Elms
  - American elm ..... *Ulmus americana*
  - Slippery elm ..... *Ulmus rubra*
  - Rock elm ..... *Ulmus thomasii*
- Paper birch ..... *Betula papyrifera*

Other hardwoods
- Boxelder ..... *Acer negundo*
- River birch ..... *Betula nigra*
- Black willow ..... *Salix nigra*

[6]*The common and scientific names are based on: Little, Elbert L. Checklist of native and naturalized trees of the United States. Agric. Handb. 541. Washington, DC:U.S. Department of Agriculture, Forest Service; 1979. 375 p.*

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.

1,000 acres = 405 hectares.

1,000 board feet (International ¼-inch log rule) = 3.48 cubic meters.

Breast height = 1.4 meters above the ground.

1 cubic foot = 0.0283 cubic meter.

1 foot = 30.48 centimeters or 0.3048 meter.

1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.

1 pound = 0.454 kilogram.

1 ton = 0.907 metric ton.

DEFINITION OF TERMS

Acceptable trees.—Growing-stock trees of commercial species that meet specified standards of size and quality but do not qualify as desirable trees.

Area-condition classes.—Class 10.—Areas fully stocked with desirable trees but not overstocked.

Class 20.—Areas fully stocked with desirable trees but overstocked with all live trees.

Class 30.—Areas medium to fully stocked with desirable trees and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 40.—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.

Class 50.—Areas poorly stocked with desirable trees but fully stocked with growing-stock trees.

Class 60.—Areas poorly stocked with desirable trees but with medium to full stocking of growing-stock trees.

Class 70.—Areas poorly stocked with desirable trees and poorly stocked with growing-stock trees.

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The above-ground volume of all live trees (including bark and foliage) reported in green tons. Biomass is made up of 5 components:

Growing-stock bole.—Biomass of a growing-stock tree from a 1-foot stump to a variable 4-inch top.

Growing-stock tops and limbs.—Biomass of a growing-stock tree from a 1-foot stump minus the growing-stock bole.

Cull bole.—Biomass of a cull tree from a 1-foot stump to a variable 4-inch top.

Cull tops and limbs.—Biomass of a cull tree from a 1-inch stump minus the cull bole.

1- to 5-inch trees.—Biomass of all live trees 1- to 5-inches in diameter at breast height.

Commercial forest land.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as commercial forest land have the capability of producing in excess of 20 cubic feet per acre per year of annual growth under management. Currently inaccessible and inoperable areas are included, except when the areas involved are small and unlikely to become suitable for production of industrial wood in the foreseeable future.) Also see definition of pastured commercial forest land.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam and hawthorn.)

County and municipal land.—Lands owned by counties and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Cull.—Portions of a tree that are unusable for industrial wood products, because of rot, form, or other defect.

Desirable trees.—Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age. These are trees that would be favored by forest managers in silvicultural operations.

Diameter classes.—A classification of trees based on diameter outside bark, measured at breast height (4½ feet above the ground). (Note: d.b.h. is the common abbreviation for diameter at breast height. Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h. inclusive).

Farm.—Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totals $50 or more annually, or a place operated as a unit of less than 10 acres from which the sale of agricultural products for a year amounts to at least $250. Places having less than the $50 or $250 minimum estimated sales in a given year are also counted as farms if they can normally be expected to produce goods in sufficient quantity to meet the requirements of the definition.

Farmer-owned land.—Land owned by farm operators. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparison of basal area and/or number of trees, by age or size and spacing with specified standards.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width

of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. Also see definitions for land area, commercial forest land, noncommercial forest land, productive-reserved forest land, stocking, unproductive forest land, and water.

Forest industry land.—Land owned by companies or individuals operating primary wood-using plants.

Forest trees.—Woody plants having a well-developed stem and usually more than 12 feet in height at maturity.

Forest type.—A classification of forest land based upon the species forming a plurality of live tree stocking. Major forest types in Michigan are:

Jack pine.—Forests in which jack pine comprises a plurality of the stocking. (Common associates include eastern white pine, red pine, aspen, birch, and maple.)

Red pine.—Forests in which red pine comprises a plurality of the stocking. (Common associates include eastern white pine, jack pine, aspen, birch, and maple.)

White pine.—Forests in which eastern white pine comprises a plurality of the stocking. (Common associates include red pine, jack pine, aspen, birch, and maple.)

Balsam fir.—Forests in which balsam fir and white spruce comprise a plurality of stocking with balsam fir the most common. (Common associates include white spruce, aspen, maple, birch, northern white-cedar, and tamarack.)

White spruce.—Forests in which white spruce and balsam fir comprise a plurality of the stocking with white spruce the most common. (Common associates include balsam fir, aspen, maple, birch, northern white-cedar, and tamarack.)

Black spruce.—Forests in which swamp conifers comprise a plurality of the stocking with black spruce the most common. (Common associates include tamarack and northern white-cedar.)

Northern white-cedar.—Forests in which swamp conifers comprise a plurality of the stocking with northern white-cedar the most common. (Common associates include tamarack and black spruce.)

Tamarack.—Forests in which swamp conifers comprise a plurality of the stocking with tamarack the most common. (Common associates include black spruce and northern white-cedar.)

Oak-hickory.—Forests in which northern red oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. (Common associates include jack pine, beech, yellow-poplar, elm, and maple.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, cottonwood, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include birches, spruce, and balsam fir.)

Maple-birch.—Forests in which sugar maple, basswood, yellow birch, upland American elm, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include white pine, elm, hemlock, and basswood.)

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. (Common associates include balsam poplar, balsam fir, and paper birch.)

Paper birch.—Forests in which paper birch comprises a plurality of the stocking. (Common associates include maple, aspen, and balsam fir.)

Exotic.—Forests in which species not native to Michigan comprise a plurality of the stocking. (Mostly scotch pine plantations.)

Gross area.—The entire area of land and water as determined by the Bureau of the Census, 1970.

Growing-stock trees.—Live trees of commercial species qualifying as desirable and acceptable trees. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from a 1-foot stump to a minimum 4.0 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Cubic feet can be converted to cords by multiplying by 79 cubic feet per solid wood cord.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Idle farmland.—Includes former croplands, orchards, improved pastures, and farm sites not tended within the past 2 years and presently less than 16.7 percent stocked with trees.

Improved pasture.—Land currently improved for grazing, by cultivation, seeding, irrigation, or clearing of trees or brush and less than 16.7 percent stocked with live trees.

Indian land.—Tribal lands held in fee but administered by the Federal Government.

Land area.—A. *Bureau of the Census.* The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than

one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

B. *Forest Survey.* The same as the Bureau of the Census, except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.

Live trees.—Growing-stock, rough and rotten trees 1 inch d.b.h. and larger.

Log grades.—A classification of logs based on external characteristics as indicators of quality or value. (See Appendix for specific grading factors used.)

Logging residues.—The unused growing stock portions of trees cut or killed by logging.

Maintained road.—Any road, hard-topped or other surfaces, that is plowed or graded at least once a year. Includes rights-of-way that are cut or treated to limit herbaceous growth.

Marsh.—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw log section that meets pulpwood or saw log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest, and land administered by the Bureau of Land Management.

Miscellaneous private land.—Privately owned land other than forest-industry and farmer-owned land.

Mortality.—The volume of sound wood in growing-stock and sawtimber trees that die annually.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land under the administration of the USDA Forest Service.

Net annual growth of growing-stock.— The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in the volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial forest land.—(a) Unproductive forest land and (b) productive-reserved forest land.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area, to qualify as nonforest land.)

a. *Nonforest land without trees.*—Nonforest land with no live trees present.

b. *Nonforest land with trees.*—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Other removals.—Growing-stock trees removed but not utilized for products, or trees left standing but "removed" from the commercial forest land classification by land use change. Examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Ownership.—Property owned by one owner, regardless of the number of parcels in a specified area.

Ownership size class.—The amount of commercial forest land owned by one owner, regardless of the number or parcels.

Owner tenure.—The length of time a property has been held by the owner.

Physiographic class.—A measure of soil and water conditions that affect tree growth on a site. Physiographic classes used in Resources Evaluation inventories are:

Xeric sites.—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: sandy jack pine plains.

Xeromesic sites.—Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

Mesic sites.—Deep, well-drained soils. Growth and species occurrence are limited only by climate.

Hydromesic sites.—Moderately wet soils where

insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: better drained bottomland hardwood sites.

Hydric sites.—Very wet sites where excess water seriously limits both growth and species occurrence. Example: wet, frequently flooded river bottoms and spruce bogs.

Plant byproducts.—Plant residues used for products such as mulch, pulp chips, and fuelwood.

Plant residues.—Wood and bark materials generated at manufacturing plants during production of other products.

Poletimber stands.—(See stand-size class.)

Poletimber trees.—Growing-stock trees of commercial species at least 5.0 inches d.b.h., but smaller than sawtimber size.

Productive-reserved forest land.—Forest land sufficiently productive to qualify as commercial forest land but withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet Regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet Regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs and bolts; cooperage logs and bolts; pulpwood; fuelwood; piling; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

Salvable dead trees.—Standing or down dead trees that are considered merchantable by Regional standards.

Saplings.—Live trees 1.0 to 5.0 inches d.b.h.

Sapling-seedling stands.—(See stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7 inches (9 inches for hardwoods) or other combinations of size and defect specified by Regional standards.

Saw log portion.—That part of the bole of sawtimber trees between the stump and the saw log top.

Saw log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stands.—(See stand-size class.)

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting Regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume of the saw log portion of live sawtimber in board feet, International ¼-inch rule, from stump to a minimum 7 inches top diameter outside bark (d.o.b.) for softwoods and a minimum 9 inches top d.o.b. for hardwoods.

Seedlings.—Live trees less than 1.0 inch d.b.h. that are expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—Sawtimber-size trees of commercial species that contain at least one merchantable 8-to 11-foot saw log but not a 12-foot saw log.

Shrub biomass.—The total above-ground weight (including the bark) of selected shrubs and trees less than 1 inch d.b.h.

Site class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A growth of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-area class.—The extent of a continuous forested area of the same forest type, stand-size class, and stand-density class.

Stand-size class.—A classification of forest land based on the size class of growing-stock trees on the area; that is, sawtimber, poletimber or seedlings and saplings.

a. *Sawtimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

b. *Poletimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

c. *Sapling-seedling stands.*—Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

d. *Nonstocked stands.*—Stands in which stocking of growing-stock trees is less than 16.7 percent.

State land.—Land owned by States, or land leased to these governmental units for 50 years or more.

Stocking.—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of trees is 134.0 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 101.0 to 133.9 percent.

Medium stocked stands.—Stands in which stocking of trees is from 61.0 to 100.9 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 60.9 percent.

Nonstocked areas.—Commercial forest land on which stocking of trees is less than 16.7 percent.

Timber removals from growing stock.—The volume of sound wood in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other removals.

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products annually (including roundwood products and logging residues) and for other removals.

Timber products output.—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Tree biomass.—The total aboveground weight (including the bark) of all trees 1 to 5 inches in d.b.h., and the total aboveground weight (including the bark) from a 1-foot stump for trees more than 5 inches in diameter.

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, and seedlings.

Unproductive forest land.—Forest land incapable of producing 20 cubic feet per acre of annual growth or of yielding crops of industrial wood under natural conditions because of adverse site conditions. (Note: Adverse conditions include shallow soils, dry climate, poor drainage, high elevation, steepness, and rockiness.

Upper stem portion.—That part of the bole of sawtimber trees above the saw log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; schoolyards, cemeteries, roads; railroads; airports; beaches; powerlines; and other rights-of-way; or other nonforest land not included in any other specified land use class.

Water.—(a) *Bureau of the Census.*—Streams, sloughs, estuaries, and canals more than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds more than 40 acres in area.

(b) *Noncensus.*—The same as the Bureau of the Census, except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for commercial forest land except that it is less than 120 feet wide.

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Table 1.--Area of land by land class, Western Upper Peninsula, Michigan, 1966[1/] and 1980

(In thousand acres)

Land class	[1/]1966	1980
FOREST LAND		
Commercial forest		
Jack pine	127.9	88.3
Red pine	59.4	57.6
White pine	70.9	48.7
Balsam fir-white spruce	479.0	407.2
Black spruce	166.8	209.5
Northern white-cedar	255.3	210.2
Tamarack	42.1	36.0
Oak-hickory	72.6	22.6
Elm-ash-soft maple	245.6	169.7
Maple-birch	2,223.5	2,372.4
Aspen	987.2	733.3
Paper birch	121.0	143.8
Exotic	--	1.6
Nonstocked	69.6	28.7
Subtotal	4,920.9	4,529.6
Noncommercial forest land		
Unproductive	77.0	62.2
Productive-reserved	185.4	266.7
Subtotal	262.4	328.9
Total	5,183.3	4,858.5
NONFOREST LAND		
Cropland	217.5	224.5
Pasture and range	63.7	156.0
Other	107.3	287.4
Total	388.5	667.9
TOTAL LAND	[2/]5,571.8	[3/]5,526.4
WATER (BUREAU OF THE CENSUS)	[2/]121.6	[3/]167.0
TOTAL LAND AND WATER	[2/]5,693.4	[3/]5,693.4

[1/]Figures have been adjusted from those published after the 1966 survey to conform to 1980 areas because of changes in survey procedures and definitions.

[2/]U.S. Department of Commerce, Bureau of the Census. 1950.

[3/]U.S. Department of Commerce, Bureau of the Census, 1970. Area Measurement Reports, GE-20, No. 1.

Table 2.--Area of land by land use class and county,
Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Land use class	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
FOREST LAND									
Commercial forest	4,529.6	513.2	376.6	619.9	513.7	654.0	207.1	970.4	674.7
Unproductive forest	62.2	5.4	1.5	11.1	8.6	9.2	--	23.6	2.8
Productive reserved	266.7	21.2	2.9	23.6	11.4	1.5	126.0	32.9	47.2
Total	4,858.5	539.8	381.0	654.6	533.7	664.7	333.1	1,026.9	724.7
NONFOREST LAND									
Nonforest with trees									
Cropland with trees	3.5	--	--	--	--	--	--	--	3.5
Improved pasture with trees	12.7	--	5.5	--	--	5.4	--	1.8	--
Wooded strips	--	--	--	--	--	--	--	--	--
Idle farmland with trees	--	--	--	--	--	--	--	--	--
Marsh with trees	15.1	1.5	--	7.4	--	2.5	1.9	--	1.8
Urban and other windbreaks	--	--	--	--	--	--	--	--	--
Windbreaks	--	--	--	--	--	--	--	--	--
Wooded pasture	1.8	--	--	--	1.8	--	--	--	--
Subtotal	33.1	1.5	5.5	7.4	1.8	7.9	1.9	1.8	5.3
Nonforest without trees									
Cropland without trees	189.2	9.9	29.9	9.3	56.1	11.7	--	14.3	58.0
Improved pasture without trees	141.5	5.9	26.2	10.9	23.5	24.8	1.6	30.0	18.6
Idle farm without trees	--	--	--	--	--	--	--	--	--
Marsh without trees	89.1	11.5	12.5	3.8	7.3	20.2	3.3	28.4	2.1
Other farm-farmstead	31.8	2.0	2.2	1.5	3.6	3.4	--	8.7	10.4
Urban and other	183.2	5.9	27.3	20.9	24.9	16.8	4.2	60.3	22.9
Subtotal	634.8	35.2	98.1	46.4	115.4	76.9	9.1	141.7	112.0
Total	667.9	36.7	103.6	53.8	117.2	84.8	11.0	143.5	117.3
TOTAL LAND	5,526.4	576.5	484.6	708.4	650.9	749.5	344.1	1,170.4	842.0
WATER (BUREAU OF THE CENSUS)	167.0	15.5	3.7	25.0	19.2	30.7	31.6	31.5	9.8
TOTAL LAND AND WATER	5,693.4	592.0	488.3	733.4	670.1	780.2	375.7	1,201.9	851.8

Table 3.--Area of commercial forest land by ownership class and county, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
National Forest	827.7	37.7	--	259.4	129.7	152.4	--	5.7	242.8
Bureau of Land Mgmt.	--	--	--	--	--	--	--	--	--
Miscellaneous federal	1.6	--	--	--	--	--	1.6	--	--
Indian	16.3	16.3	--	--	--	--	--	--	--
State	620.3	65.9	182.8	--	43.9	90.1	2.7	218.5	16.4
County and municipal	87.6	1.3	1.6	67.4	--	3.2	--	10.8	3.3
Forest industry	1,269.3	291.9	31.2	134.2	90.2	197.2	36.7	297.7	190.2
Farmer	194.1	28.9	28.9	8.3	19.3	29.1	--	44.7	34.9
Misc. private-corp.	668.4	14.5	28.1	93.3	112.9	44.9	135.7	135.8	103.2
Misc. private-indiv.	844.3	56.7	104.0	57.3	117.7	137.1	30.4	257.2	83.9
All owners	4,529.6	513.2	376.6	619.9	513.7	654.0	207.1	970.4	674.7

Table 4.--Area of commercial forest land by forest type, physiographic class, and ownership class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type and physiographic class	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. Federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Jack pine											
Hydric	1.6	--	--	--	--	--	--	1.6	--	--	--
Hydromesic	--	--	--	--	--	--	--	--	--	--	--
Mesic	17.9	6.3	--	--	--	3.4	--	1.7	--	1.7	4.8
Xeromesic	53.3	12.7	--	--	--	20.5	2.9	3.1	--	4.4	9.7
Xeric	15.5	6.3	--	--	--	1.6	4.7	1.2	--	--	1.7
All classes	88.3	25.3	--	--	--	25.5	7.6	7.6	--	6.1	16.2
Red pine											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	3.3	--	--	--	--	--	--	--	--	3.3	--
Mesic	33.1	21.5	--	--	--	5.2	--	1.7	--	--	4.7
Xeromesic	21.2	15.4	--	--	--	4.1	--	--	--	1.7	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	57.6	36.9	--	--	--	9.3	--	1.7	--	5.0	4.7
White pine											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	3.0	--	--	--	--	1.7	--	1.3	--	--	--
Mesic	42.3	11.1	--	--	--	9.9	--	9.5	3.4	6.8	1.6
Xeromesic	3.4	--	--	--	--	1.7	--	--	--	1.7	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	48.7	11.1	--	--	--	13.3	--	10.8	3.4	8.5	1.6
Balsam fir											
Hydric	30.4	8.7	--	--	--	2.3	--	11.3	1.3	5.4	1.4
Hydromesic	187.4	19.7	--	--	--	35.1	1.6	58.9	2.9	21.7	47.5
Mesic	143.9	44.2	--	1.6	--	22.5	1.7	31.2	3.3	13.3	26.1
Xeromesic	4.9	--	--	--	--	1.6	--	1.7	1.6	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	366.6	72.6	--	1.6	--	61.5	3.3	103.1	9.1	40.4	75.0
White spruce											
Hydric	1.4	--	--	--	--	1.4	--	--	--	--	--
Hydromesic	8.2	--	--	--	--	1.7	--	3.2	--	1.6	1.7
Mesic	27.4	--	--	--	--	6.6	--	12.9	1.7	5.0	1.2
Xeromesic	3.6	--	--	--	--	--	--	2.0	--	--	1.6
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	40.6	--	--	--	--	9.7	--	18.1	1.7	6.6	4.5

(Table 4 continued on next page)

(Table 4 continued)

Forest type and physiographic class	All owners	Ownership class: National Forest	Bureau of Land Mgmt.	Misc. Federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Black spruce											
Hydric	73.8	12.0	--	--	--	12.3	1.6	25.0	1.6	3.9	17.4
Hydromesic	113.0	33.2	--	--	--	30.3	1.7	14.8	.0	6.7	26.3
Mesic	20.0	7.5	--	--	--	6.4	--	1.4	1.7	1.3	1.7
Xeromesic	2.7	--	--	--	--	--	--	1.5	--	1.2	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	209.5	1/52.7	--	--	--	49.0	3.3	42.7	3.3	13.1	45.4
Northern white-cedar											
Hydric	25.9	--	--	--	--	4.5	1.3	13.3	--	4.0	2.8
Hydromesic	171.3	--	--	--	--	46.5	4.8	57.0	3.1	34.1	25.8
Mesic	13.0	--	--	--	--	1.6	1.6	4.9	--	4.9	--
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	210.2	--	--	--	--	52.6	7.7	75.2	3.1	43.0	28.6
Tamarack											
Hydric	20.8	--	--	--	--	8.3	--	5.6	1.8	3.9	1.2
Hydromesic	15.2	--	--	--	--	4.1	--	4.5	1.6	--	5.0
Mesic	--	--	--	--	--	--	--	--	--	--	--
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	36.0	--	--	--	--	12.4	--	10.1	3.4	3.9	6.2
Oak-hickory											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	3.2	--	--	--	--	1.6	--	1.6	--	--	--
Mesic	16.0	--	--	--	--	1.5	--	1.7	--	6.4	6.4
Xeromesic	3.4	--	--	--	--	--	--	--	--	3.4	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	22.6	--	--	--	--	3.1	--	3.3	--	9.8	6.4
Elm-ash-soft maple											
Hydric	7.8	--	--	--	--	1.4	--	3.6	--	--	2.8
Hydromesic	158.5	13.6	--	--	--	23.2	8.4	45.7	15.9	22.2	29.5
Mesic	3.4	--	--	--	--	--	--	--	--	1.3	2.1
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	169.7	13.6	--	--	--	24.6	8.4	49.3	15.9	23.5	34.4

(Table 4 continued on next page)

(Table 4 continued)

Forest type and physiographic class	All owners	Ownership class: National Forest	Bureau of Land Mgmt.	Misc. Federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Maple-birch											
Hydric	2.3	--	--	--	--	--	--	--	--	--	2.3
Hydromesic	178.1	53.0	--	--	--	12.9	4.9	46.9	6.0	35.3	19.1
Mesic	2,173.4	360.2	--	--	9.6	187.0	37.4	734.0	98.9	343.5	402.8
Xeromesic	18.6	10.4	--	--	--	--	--	4.9	--	2.9	0.4
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	2,372.4	423.6	--	--	9.6	199.9	42.3	785.8	104.9	381.7	424.6
Aspen											
Hydric	3.3	--	--	--	--	0.9	--	--	--	--	2.4
Hydromesic	98.4	22.9	--	--	1.6	16.5	--	20.9	2.7	12.6	21.2
Mesic	610.8	133.4	--	--	5.1	118.6	11.7	95.8	33.7	85.9	126.6
Xeromesic	20.8	7.7	--	--	--	4.6	--	--	1.7	3.4	3.4
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	733.3	164.0	--	--	6.7	140.6	11.7	116.7	38.1	101.9	153.6
Paper birch											
Hydric	1.3	--	--	--	--	--	--	--	1.3	--	--
Hydromesic	16.0	--	--	--	--	--	--	4.7	1.7	3.3	6.3
Mesic	126.5	16.7	--	--	--	16.5	3.3	37.7	6.6	19.9	25.8
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	143.8	16.7	--	--	--	16.5	3.3	42.4	9.6	23.2	32.1
Exotic											
Hydric	--	--	--	--	--	--	--	--	--	--	--
Hydromesic	--	--	--	--	--	--	--	--	--	--	--
Mesic	1.6	--	--	--	--	--	--	--	1.6	--	--
Xeromesic	--	--	--	--	--	--	--	--	--	--	--
Xeric	--	--	--	--	--	--	--	--	--	--	--
All classes	1.6	--	--	--	--	--	--	--	1.6	--	--
Nonstocked											
Hydric	3.7	--	--	--	--	2.3	--	--	--	--	1.4
Hydromesic	2.9	--	--	--	--	--	--	--	--	--	2.9
Mesic	15.2	11.2	--	--	--	--	--	--	--	--	4.0
Xeromesic	2.9	--	--	--	--	--	--	--	--	1.7	1.2
Xeric	4.0	--	--	--	--	--	--	2.5	--	--	1.5
All classes	28.7	11.2	--	--	--	2.3	--	2.5	--	1.7	11.0
All types											
Hydric	172.3	20.7	--	--	--	33.4	2.9	60.4	6.0	17.2	31.7
Hydromesic	958.5	142.4	--	--	1.6	173.6	21.4	259.5	33.9	140.8	185.3
Mesic	3,244.5	612.1	--	1.6	14.7	379.2	55.7	932.5	150.9	490.0	607.8
Xeromesic	134.8	46.2	--	--	--	32.5	2.9	13.2	3.3	20.4	16.3
Xeric	19.5	6.3	--	--	--	1.6	4.7	3.7	--	--	3.2
All classes	4,529.6	827.7	--	1.6	16.3	620.3	87.6	1,269.3	194.1	668.4	844.3

1/Classified as mixed swamp conifer on Ottawa National Forest land management plan.

Table 5.--Area of commercial forest land by ownership class and site class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All classes	Site class (cubic feet of growth/acre/year)					
		225+	165-224	120-164	85-119	50-84	20-49
National Forest	827.7	--	--	17.0	187.4	395.3	228.0
Bureau of Land Mgmt.	--	--	--	--	--	--	--
Miscellaneous federal	1.6	--	--	--	1.6	--	--
Indian	16.3	--	--	--	1.7	13.1	1.5
State	620.3	--	3.3	19.9	106.8	253.8	236.5
County and municipal	87.6	--	--	--	8.3	43.7	35.6
Forest industry	1,269.3	--	--	17.8	165.1	488.3	598.1
Farmer	194.1	--	--	--	42.1	100.4	51.6
Misc. private-corp.	668.4	--	--	14.1	95.0	270.5	288.8
Misc. private-indiv.	844.3	--	1.6	23.7	148.0	378.9	292.1
All owners	4,529.6	--	4.9	92.5	756.0	1,944.0	1,732.2

Table 6.--Area of commercial forest land by ownership class and stand-volume class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All classes	Stand-volume class (board feet[1/])		
		Less than 1,500	1,500 to 5,000	5,000+
National Forest	827.7	253.6	414.5	159.6
Bureau of Land Mgmt.	--	--	--	--
Miscellaneous federal	1.6	--	1.6	--
Indian	16.3	3.1	8.3	4.9
State	620.3	246.3	245.9	128.1
County and municipal	87.6	28.8	52.3	6.5
Forest industry	1,269.3	310.7	585.3	373.3
Farmer	194.1	85.3	88.1	20.7
Misc. private-corp.	668.4	170.5	312.4	185.5
Misc. private-indiv.	844.3	308.4	386.4	149.5
All owners	4,529.6	1,406.7	2,094.8	1,028.1

[1/] International 1/4-inch rule.

Table 7.--Area of privately owned commercial forest land by ownership class, owner tenure, and size of owner, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Ownership class and owner tenure class	Total	Size of owner (acres)								
		1-4	5-10	11-20	21-50	51-100	101-500	501-2,500	2,501-5,000	5001+
Forest Industry										
1-4 years	220.3	--	--	--	1.6	--	1.6	4.7	--	212.4
5-9 years	69.3	--	--	--	2.3	--	1.6	4.8	--	60.6
10-19 years	355.1	--	--	--	--	--	--	1.6	4.9	348.6
20+ years	624.6	--	--	--	--	--	3.3	1.5	3.2	616.6
All classes	1,269.3	--	--	--	3.9	--	6.5	12.6	8.1	1,238.2
Farmer										
1-4 years	51.0	--	--	3.4	6.5	8.2	31.3	1.6	--	--
5-9 years	34.5	--	1.7	--	5.0	8.9	12.4	6.5	--	--
10-19 years	36.6	--	--	--	9.7	12.8	10.9	1.6	--	1.6
20+ years	72.0	--	3.2	4.9	11.1	25.1	27.7	--	--	--
All classes	194.1	--	4.9	8.3	32.3	55.0	82.3	9.7	--	1.6
Misc. priv.-corporation										
1-4 years	41.4	--	--	--	--	--	7.2	9.1	--	25.1
5-9 years	43.4	--	--	--	3.3	--	5.0	--	--	35.1
10-19 years	209.6	--	--	--	1.6	--	4.5	1.6	4.9	197.0
20+ years	374.0	--	--	--	--	1.7	11.2	11.6	4.8	344.7
All classes	668.4	--	--	--	4.9	1.7	27.9	22.3	9.7	601.9
Misc. priv.-individual										
1-4 years	217.0	2.8	--	9.9	58.4	48.2	68.4	12.0	4.8	12.5
5-9 years	166.7	--	1.6	11.0	44.5	30.9	62.8	12.5	1.8	1.6
10-19 years	200.3	3.2	--	--	55.8	36.8	75.4	19.2	4.9	5.0
20+ years	260.3	1.7	--	3.2	71.3	52.6	83.5	28.9	1.6	17.5
All classes	844.3	7.7	1.6	24.1	230.0	168.5	290.1	72.6	13.1	36.6
All private owners										
1-4 years	529.7	2.8	.0	13.3	66.5	56.4	108.5	27.4	4.8	250.0
5-9 years	313.9	.0	3.3	11.0	55.1	39.8	81.8	23.8	1.8	97.3
10-19 years	801.6	3.2	.0	.0	67.1	49.6	90.8	24.0	14.7	552.2
20+ years	1,330.9	1.7	3.2	8.1	82.4	79.4	125.7	42.0	9.6	978.8
All classes	2,976.1	7.7	6.5	32.4	271.2	225.2	406.8	117.2	30.9	1,878.3

Table 8.--Area of commercial forest land by forest type, stand-size class, and ownership class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type and stand-size class	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Jack pine											
Sawtimber	39.4	--	--	--	--	17.6	4.8	3.3	--	1.6	12.1
Poletimber	41.9	25.3	--	--	--	5.8	1.6	3.1	--	4.5	1.6
Sapling & seedling	7.0	--	--	--	--	2.1	1.2	1.2	--	--	2.5
All stands	88.3	25.3	--	--	--	25.5	7.6	7.6	--	6.1	16.2
Red pine											
Sawtimber	21.9	5.9	--	--	--	4.6	--	1.7	--	5.0	4.7
Poletimber	21.4	18.6	--	--	--	2.8	--	--	--	--	--
Sapling & seedling	14.3	12.4	--	--	--	1.9	--	--	--	--	--
All stands	57.6	36.9	--	--	--	9.3	--	1.7	--	5.0	4.7
White pine											
Sawtimber	42.0	11.1	--	--	--	10.0	--	9.1	1.7	8.5	1.6
Poletimber	6.7	--	--	--	--	3.3	--	1.7	1.7	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--
All stands	48.7	11.1	--	--	--	13.3	--	10.8	3.4	8.5	1.6
Balsam fir											
Sawtimber	77.6	--	--	1.6	--	16.4	--	26.1	2.9	8.1	22.5
Poletimber	193.3	55.2	--	--	--	35.4	1.7	38.0	2.9	22.0	38.1
Sapling & seedling	95.7	17.4	--	--	--	9.7	1.6	39.0	3.3	10.3	14.4
All stands	366.6	72.6	--	1.6	--	61.5	3.3	103.1	9.1	40.4	75.0
White spruce											
Sawtimber	13.5	--	--	--	--	--	--	5.3	--	6.6	1.6
Poletimber	22.2	--	--	--	--	4.8	--	12.8	1.7	--	2.9
Sapling & seedling	4.9	--	--	--	--	4.9	--	--	--	--	--
All stands	40.6	--	--	--	--	9.7	--	18.1	1.7	6.6	4.5
Black spruce											
Sawtimber	7.2	--	--	--	--	4.3	--	--	--	1.2	1.7
Poletimber	98.1	45.8	--	--	--	13.5	1.7	14.0	--	1.6	21.5
Sapling & seedling	104.2	6.9	--	--	--	31.2	1.6	28.7	3.3	10.3	22.2
All stands	209.5	1/52.7	--	--	--	49.0	3.3	42.7	3.3	13.1	45.4
Northern white-cedar											
Sawtimber	88.3	--	--	--	--	8.9	3.2	39.0	--	31.2	6.0
Poletimber	97.1	--	--	--	--	39.5	3.2	30.1	1.7	7.2	15.4
Sapling & seedling	24.8	--	--	--	--	4.2	1.3	6.1	1.4	4.6	7.2
All stands	210.2	--	--	--	--	52.6	7.7	75.2	3.1	43.0	28.6

(Table 8 continued on next page)

(Table 8 continued)

Forest type and stand-size class	All owners	Ownership class: National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Tamarack											
Sawtimber	4.6	--	--	--	--	0.9	--	--	--	2.4	1.3
Poletimber	9.6	--	--	--	--	1.6	--	6.2	1.8	--	--
Sapling & seedling	21.8	--	--	--	--	9.9	--	3.9	1.6	1.5	4.9
All stands	36.0	--	--	--	--	12.4	--	10.1	3.4	3.9	6.2
Oak-hickory											
Sawtimber	11.0	--	--	--	--	3.1	--	3.3	--	3.1	1.5
Poletimber	10.0	--	--	--	--	--	--	--	--	6.7	3.3
Sapling & seedling	1.6	--	--	--	--	--	--	--	--	--	1.6
All stands	22.6	--	--	--	--	3.1	--	3.3	--	9.8	6.4
Elm-ash-soft maple											
Sawtimber	63.2	5.5	--	--	--	8.2	--	21.8	1.5	14.1	12.1
Poletimber	67.0	8.1	--	--	--	6.3	8.4	23.0	9.8	3.2	8.2
Sapling & seedling	39.5	--	--	--	--	10.1	--	4.5	4.6	6.2	14.1
All stands	169.7	13.6	--	--	--	24.6	8.4	49.3	15.9	23.5	34.4
Maple-birch											
Sawtimber	1,144.2	161.1	--	--	3.2	111.7	8.2	484.4	28.3	192.9	154.4
Poletimber	1,028.9	249.7	--	--	6.4	70.1	30.8	236.0	64.9	146.9	224.1
Sapling & seedling	199.3	12.8	--	--	--	18.1	3.3	65.4	11.7	41.9	46.1
All stands	2,372.4	423.6	--	--	9.6	199.9	42.3	785.8	104.9	381.7	424.6
Aspen											
Sawtimber	113.6	--	--	--	--	23.2	3.3	21.5	11.0	24.9	29.7
Poletimber	406.6	115.1	--	--	5.1	57.5	5.0	54.3	18.4	54.1	97.1
Sapling & seedling	213.1	48.9	--	--	1.6	59.9	3.4	40.9	8.7	22.9	26.8
All stands	733.3	164.0	--	--	6.7	140.6	11.7	116.7	38.1	101.9	153.6
Paper birch											
Sawtimber	21.1	--	--	--	--	1.6	--	8.2	--	6.6	4.7
Poletimber	101.7	16.7	--	--	--	14.9	--	27.5	6.6	14.8	21.2
Sapling & seedling	21.0	--	--	--	--	--	3.3	6.7	3.0	1.8	6.2
All stands	143.8	16.7	--	--	--	16.5	3.3	42.4	9.6	23.2	32.1
Exotic											
Sawtimber	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	1.6	--	--	--	--	--	--	--	1.6	--	--
All stands	1.6	--	--	--	--	--	--	--	1.6	--	--
Nonstocked	28.7	11.2	--	--	--	2.3	--	2.5	--	1.7	11.0
All types											
Sawtimber	1,647.6	183.6	--	1.6	3.2	210.5	19.5	623.7	45.4	306.2	253.9
Poletimber	2,104.5	534.5	--	--	11.5	255.5	52.4	446.7	109.5	261.0	433.4
Sapling & seedling	748.8	98.4	--	--	1.6	152.0	15.7	196.4	39.2	99.5	146.0
Nonstocked	28.7	11.2	--	--	--	2.3	--	2.5	--	1.7	11.0
All stands	4,529.6	827.7	--	1.6	16.3	620.3	87.6	1,269.3	194.1	668.4	844.3

1/Classified as mixed swamp conifer on Ottowa National Forest land management plan.

Table 9.--Area of commercial forest land by forest type and county, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
Jack pine	88.3	4.3	1.7	2.6	12.0	7.2	--	55.3	5.2
Red pine	57.6	4.1	4.8	9.0	12.0	6.5	1.7	9.0	10.5
White pine	48.7	.1	1.7	0.9	2.8	14.1	3.4	17.5	8.2
Balsam fir	366.6	41.4	41.5	48.5	20.9	80.6	16.0	82.6	35.1
White spruce	40.6	1.5	4.9	--	1.2	6.7	--	11.7	14.6
Black spruce	209.5	20.0	20.8	33.2	9.7	36.0	2.4	79.1	8.3
Northern white-cedar	210.2	28.9	46.7	12.9	13.5	10.4	36.7	61.1	--
Tamarack	36.0	5.5	3.5	2.7	3.9	15.6	--	4.8	--
Oak-hickory	22.6	--	1.5	3.2	1.6	--	8.1	8.2	--
Elm-ash-soft maple	169.7	18.0	13.0	36.8	17.0	6.9	6.1	42.1	29.8
Maple-birch	2,372.4	335.0	103.6	386.5	345.2	294.1	99.8	421.6	386.6
Aspen	733.3	40.7	116.4	68.7	57.5	149.8	15.0	121.7	163.5
Paper birch	143.8	10.8	13.4	11.1	10.7	23.8	17.9	48.9	7.2
Exotic	1.6	--	--	--	--	--	--	1.6	--
Nonstocked	28.7	2.9	3.1	3.8	5.7	2.3	--	5.2	5.7
All types	4,529.6	513.2	376.6	619.9	513.7	654.0	207.1	970.4	674.7

Table 10.--Area of commercial forest land by county and stand-size class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

County	All stands	Stand-size class			
		Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Baraga	513.2	283.8	154.4	72.1	2.9
Dickinson	376.6	74.1	190.8	108.6	3.1
Gogebic	619.9	168.3	354.3	93.5	3.8
Houghton	513.7	212.5	233.8	61.7	5.7
Iron	654.0	208.9	309.1	133.7	2.3
Keweenaw	207.1	121.2	62.2	23.7	--
Marquette	970.4	367.1	436.2	161.9	5.2
Ontonagon	674.7	211.7	363.7	93.6	5.7
All counties	4,529.6	1,647.6	2,104.5	748.8	28.7

Table 11.--Area of commercial forest land by forest type, stand-size class, and site class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type and stand-size class	All classes	Site class (cubic feet of growth/acre/year)					
		225+	165-224	120-164	85-119	50-84	20-49
Jack pine							
Sawtimber	39.4	--	--	--	11.9	21.0	6.5
Poletimber	41.9	--	--	--	--	37.5	4.4
Sapling & seedling	7.0	--	--	--	--	2.8	4.2
All stands	88.3	--	--	--	11.9	61.3	15.1
Red pine							
Sawtimber	21.9	--	--	--	3.3	15.3	3.3
Poletimber	21.4	--	--	7.2	14.2	--	--
Sapling & seedling	14.3	--	--	--	--	14.3	--
All stands	57.6	--	--	7.2	17.5	29.6	3.3
White pine							
Sawtimber	42.0	--	--	1.6	6.3	32.4	1.7
Poletimber	6.7	--	--	--	3.4	3.3	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	48.7	--	--	1.6	9.7	35.7	1.7
Balsam fir							
Sawtimber	77.6	--	1.7	14.7	39.6	12.6	9.0
Poletimber	193.3	--	3.2	37.2	102.1	41.5	9.3
Sapling & seedling	95.7	--	--	4.7	39.6	17.1	34.3
All stands	366.6	--	4.9	56.6	181.3	71.2	52.6
White spruce							
Sawtimber	13.5	--	--	--	--	10.3	3.2
Poletimber	22.2	--	--	--	12.9	7.6	1.7
Sapling & seedling	4.9	--	--	--	--	4.9	--
All stands	40.6	--	--	--	12.9	22.8	4.9
Black spruce							
Sawtimber	7.2	--	--	--	--	2.9	4.3
Poletimber	98.1	--	--	--	4.4	15.5	78.2
Sapling & seedling	104.2	--	--	--	0.4	6.8	97.0
All stands	209.5	--	--	--	4.8	25.2	179.5
Northern white-cedar							
Sawtimber	88.3	--	--	--	--	13.5	74.8
Poletimber	97.1	--	--	--	--	3.2	93.9
Sapling & seedling	24.8	--	--	--	--	1.6	23.2
All stands	210.2	--	--	--	--	18.3	191.9

(Table 11 continued on next page)

(Table 11 continued)

Forest type and stand-size class	All classes	Site class (cubic feet of growth/acre/year)					
		225+	165-224	120-164	85-119	50-84	20-49
Tamarack							
Sawtimber	4.6	--	--	--	--	2.2	2.4
Poletimber	9.6	--	--	--	--	3.4	6.2
Sapling & seedling	21.8	--	--	--	--	3.5	18.3
All stands	36.0	--	--	--	--	9.1	26.9
Oak-hickory							
Sawtimber	11.0	--	--	--	--	4.6	6.4
Poletimber	10.0	--	--	--	1.6	6.8	1.6
Sapling & seedling	1.6	--	--	--	--	1.6	--
All stands	22.6	--	--	--	1.6	13.0	8.0
Elm-ash-soft maple							
Sawtimber	63.2	--	--	--	1.6	12.5	49.1
Poletimber	67.0	--	--	--	--	11.5	55.5
Sapling & seedling	39.5	--	--	--	--	7.8	31.7
All stands	169.7	--	--	--	1.6	31.8	136.3
Maple-birch							
Sawtimber	1,144.2	--	--	4.8	103.5	532.0	503.9
Poletimber	1,028.9	--	--	3.1	105.2	577.9	342.7
Sapling & seedling	199.3	--	--	--	19.8	86.5	93.0
All stands	2,372.4	--	--	7.9	228.5	1,196.4	939.6
Aspen							
Sawtimber	113.6	--	--	6.4	43.0	52.9	11.3
Poletimber	406.6	--	--	6.7	163.7	200.2	36.0
Sapling & seedling	213.1	--	--	5.1	78.2	97.0	32.8
All stands	733.3	--	--	18.2	284.9	350.1	80.1
Paper birch							
Sawtimber	21.1	--	--	--	--	1.6	19.5
Poletimber	101.7	--	--	--	--	55.6	46.1
Sapling & seedling	21.0	--	--	--	--	5.0	16.0
All stands	143.8	--	--	--	--	62.2	81.6
Exotic							
Sawtimber	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--
Sapling & seedling	1.6	--	--	--	--	1.6	--
All stands	1.6	--	--	--	--	1.6	--
Nonstocked	28.7	--	--	1.0	1.3	15.7	10.7
All types							
Sawtimber	1,647.6	--	1.7	27.5	209.2	713.8	695.4
Poletimber	2,104.5	--	3.2	54.2	407.5	964.0	675.6
Sapling & seedling	748.8	--	--	9.8	138.0	250.5	350.5
Nonstocked	28.7	--	--	1.0	1.3	15.7	10.7
All stands	4,529.6	--	4.9	92.5	756.0	1,944.0	1,732.2

Table 12.--Area of commercial forest land by forest type and stand-age class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All ages	Stand-age class (years) 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	88.3	1.2	4.5	7.6	13.4	21.8	28.6	4.7	3.1	1.7	1.7	--	--	--
Red pine	57.6	--	16.9	8.1	10.8	--	1.7	5.9	1.3	3.2	3.4	4.8	1.5	--
White pine	48.7	--	--	1.7	1.7	1.6	--	14.5	3.4	12.7	5.0	3.2	3.3	1.6
Balsam fir	366.6	29.2	32.7	37.1	35.0	55.2	55.8	35.5	34.0	16.1	13.1	15.1	2.9	4.9
White spruce	40.6	3.3	1.6	--	12.3	5.1	6.5	1.7	2.0	--	--	8.1	--	--
Black spruce	209.5	20.7	29.0	38.9	18.3	20.4	27.7	19.0	9.5	--	2.9	11.8	7.3	4.0
Northern white-cedar	210.2	4.7	7.5	9.8	2.8	11.8	17.8	26.0	22.3	26.6	11.6	39.7	15.1	14.5
Tamarack	36.0	5.1	7.0	5.5	1.4	4.4	5.8	1.6	--	--	2.9	--	--	2.3
Oak-hickory	22.6	--	--	1.6	1.7	4.9	--	3.3	--	1.5	3.1	4.9	1.6	--
Elm-ash-soft maple	169.7	15.5	17.7	8.0	9.8	11.5	13.4	13.1	14.6	13.9	8.4	16.6	14.3	12.9
Maple-birch	2,372.4	81.2	81.3	50.4	125.2	370.1	372.8	150.7	162.2	190.5	207.4	349.6	163.5	67.5
Aspen	733.3	113.5	82.1	27.1	81.4	151.0	138.0	51.2	51.9	24.5	5.0	7.6	--	--
Paper birch	143.8	5.0	10.9	5.0	8.0	14.7	42.9	26.1	9.9	8.1	6.6	--	5.0	1.6
Exotic	1.6	1.6	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	28.7	21.2	5.9	--	1.6	--	--	--	--	--	--	--	--	--
All types	4,529.6	302.2	297.1	200.8	323.4	672.5	711.0	353.3	314.2	298.8	271.1	461.4	214.5	109.3

Table 13.--Area of commercial forest land by forest type and site-index class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All classes	Site-index class (feet) 11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91+
Jack pine	88.3	--	--	1.7	5.9	10.2	45.0	15.2	10.3	--
Red pine	57.6	--	--	--	19.3	13.6	6.8	17.9	--	--
White pine	48.7	--	--	--	8.1	29.3	9.7	1.6	--	--
Balsam fir	366.6	1.4	6.5	44.8	92.0	146.4	57.0	5.0	11.9	1.6
White spruce	40.6	--	--	3.3	9.8	13.0	3.3	11.2	--	--
Black spruce	209.5	--	35.6	88.5	55.5	25.1	4.4	0.4	--	--
Northern white-cedar	210.2	16.3	103.8	58.3	18.2	2.7	10.9	--	--	--
Tamarack	36.0	--	--	12.9	14.1	5.2	3.8	--	--	--
Oak-hickory	22.6	--	--	1.7	3.2	4.7	11.4	1.6	--	--
Elm-ash-soft maple	169.7	--	3.0	39.2	41.0	35.2	35.5	14.2	1.6	--
Maple-birch	2,372.4	--	9.3	51.7	267.1	616.8	825.5	463.1	126.2	12.7
Aspen	733.3	--	--	5.3	31.9	127.4	217.3	232.0	101.2	18.2
Paper birch	143.8	--	1.3	3.1	6.7	62.1	54.6	16.0	--	--
Exotic	1.6	--	--	--	--	1.6	--	--	--	--
Nonstocked	28.7	--	2.3	2.6	2.8	17.0	2.9	1.1	--	--
All types	4,529.6	17.7	161.8	313.1	575.6	1,110.3	1,288.1	779.3	251.2	32.5

Table 14.--Area of commercial forest land by forest type, stand-size class, and basal-area class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	39.4	--	--	--	--	4.6	11.4	4.4	6.0	3.1	6.6	3.3	--	--	--
Poletimber	41.9	--	2.9	--	--	1.1	6.3	6.3	1.6	3.1	3.1	--	15.9	--	1.6
Sapling & seedling	7.0	1.2	--	1.2	2.4	1.8	0.4	--	--	--	--	--	--	--	--
All stands	88.3	1.2	2.9	1.2	2.4	7.5	18.1	10.7	7.6	6.2	9.7	3.3	15.9	--	1.6
Red pine															
Sawtimber	21.9	--	--	--	--	--	--	--	3.4	1.5	1.3	--	10.8	4.9	--
Poletimber	21.4	--	--	--	--	3.0	3.6	--	--	1.2	1.7	--	5.9	6.0	--
Sapling & seedling	14.3	--	--	12.4	0.4	--	1.5	--	--	--	--	--	--	--	--
All stands	57.6	--	--	12.4	0.4	3.0	5.1	--	3.4	2.7	3.0	--	16.7	10.9	--
White pine															
Sawtimber	42.0	--	--	--	1.7	--	--	1.3	5.2	--	6.6	4.7	6.5	16.0	--
Poletimber	6.7	--	--	--	--	--	--	--	3.4	1.6	1.7	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	48.7	--	--	--	1.7	--	--	1.3	8.6	1.6	8.3	4.7	6.5	16.0	--
Balsam fir															
Sawtimber	77.6	--	--	--	--	--	5.3	1.6	--	9.4	11.3	11.4	35.4	--	3.2
Poletimber	193.3	--	--	1.7	1.7	1.3	1.6	28.4	14.5	9.8	15.9	52.3	32.7	26.9	6.5
Sapling & seedling	95.7	1.4	20.5	1.5	10.9	5.5	5.9	21.9	4.8	4.1	11.3	3.3	3.2	1.4	--
All stands	366.6	1.4	20.5	3.2	12.6	6.8	12.8	51.9	19.3	23.3	38.5	67.0	71.3	28.3	9.7
White spruce															
Sawtimber	13.5	--	--	--	--	1.7	--	1.7	2.0	1.5	--	3.3	3.3	--	--
Poletimber	22.2	--	--	--	--	1.7	--	--	3.4	1.2	1.7	--	12.5	1.7	--
Sapling & seedling	4.9	--	--	1.6	--	1.7	1.6	--	--	--	--	--	--	--	--
All stands	40.6	--	--	1.6	--	5.1	1.6	1.7	5.4	2.7	1.7	3.3	15.8	1.7	--
Black spruce															
Sawtimber	7.2	--	--	--	--	--	--	--	2.3	--	--	--	4.9	--	--
Poletimber	98.1	--	--	--	2.9	3.4	9.2	3.3	1.6	6.4	13.0	23.0	21.0	5.7	8.6
Sapling & seedling	104.2	8.3	4.8	5.2	14.9	22.6	6.4	19.3	6.0	2.6	8.0	4.5	1.6	--	--
All stands	209.5	8.3	4.8	5.2	17.8	26.0	15.6	22.6	9.9	9.0	21.0	27.5	27.5	5.7	8.6
Northern white-cedar															
Sawtimber	88.3	--	--	--	--	1.6	1.4	3.9	3.0	--	6.4	25.3	15.2	15.2	16.3
Poletimber	97.1	--	--	--	--	--	--	1.3	3.6	2.9	9.3	13.1	22.0	22.5	22.4
Sapling & seedling	24.8	--	--	1.6	1.8	4.4	--	2.7	--	5.8	--	2.8	4.3	1.4	--
All stands	210.2	--	--	1.6	1.8	6.0	1.4	7.9	6.6	8.7	15.7	41.2	41.5	39.1	38.7

(Table 14 continued on next page)

(Table 14 continued)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack															
Sawtimber	4.6	--	--	0.9	--	2.4	--	--	--	--	--	--	1.3	--	--
Poletimber	9.6	--	--	--	2.8	--	1.7	3.4	1.7	--	--	--	--	--	--
Sapling & seedling	21.8	1.8	2.3	2.3	7.6	--	--	1.6	3.0	3.2	--	--	--	--	--
All stands	36.0	1.8	2.3	3.2	10.4	2.4	1.7	5.0	4.7	3.2	--	--	1.3	--	--
Oak-hickory															
Sawtimber	11.0	--	--	--	--	--	--	--	--	3.1	3.3	1.4	--	3.2	--
Poletimber	10.0	--	--	--	--	--	--	--	--	--	--	6.7	3.3	--	--
Sapling & seedling	1.6	--	--	--	--	--	--	--	--	--	--	1.6	--	--	--
All stands	22.6	--	--	--	--	--	--	--	--	3.1	3.3	9.7	3.3	3.2	--
Elm-ash-soft maple															
Sawtimber	63.2	--	--	--	1.3	--	1.2	--	--	2.9	3.2	11.5	23.6	17.9	1.6
Poletimber	67.0	--	--	2.0	3.3	1.6	--	3.2	4.9	3.2	10.2	8.2	14.2	14.6	1.6
Sapling & seedling	39.5	3.1	4.2	--	1.3	4.9	2.9	8.2	6.7	--	6.8	1.4	--	--	--
All stands	169.7	3.1	4.2	2.0	5.9	6.5	4.1	11.4	11.6	6.1	20.2	21.1	37.8	32.5	3.2
Maple-birch															
Sawtimber	1,144.2	--	--	--	1.5	9.2	11.0	32.5	59.8	51.5	145.2	266.8	395.2	138.2	33.3
Poletimber	1,028.9	--	--	--	--	13.6	15.9	53.6	68.9	69.0	122.5	246.3	335.6	95.3	8.2
Sapling & seedling	199.3	3.6	7.9	8.5	14.4	24.0	24.7	27.6	26.4	19.8	12.7	24.9	4.8	--	--
All stands	2,372.4	3.6	7.9	8.5	15.9	46.8	51.6	113.7	155.1	140.3	280.4	538.0	735.6	233.5	41.5
Aspen															
Sawtimber	113.6	--	2.6	--	4.6	6.2	6.4	13.3	14.2	15.2	6.6	13.0	19.9	11.6	--
Poletimber	406.6	--	--	4.3	9.1	12.4	22.8	49.5	37.8	34.5	47.1	63.8	86.8	23.9	14.6
Sapling & seedling	213.1	19.8	28.8	26.0	35.0	39.5	13.9	20.8	11.6	1.6	5.3	10.8	--	--	--
All stands	733.3	19.8	31.4	30.3	48.7	58.1	43.1	83.6	63.6	51.3	59.0	87.6	106.7	35.5	14.6
Paper birch															
Sawtimber	21.1	--	--	--	1.5	--	--	--	--	1.6	1.6	8.0	6.8	--	1.6
Poletimber	101.7	--	--	--	--	1.5	3.4	1.6	6.7	6.7	9.6	14.6	47.8	9.8	--
Sapling & seedling	21.0	--	2.7	1.7	1.7	3.4	--	3.3	1.6	3.3	--	3.3	--	--	--
All stands	143.8	--	2.7	1.7	3.2	4.9	3.4	4.9	8.3	11.6	11.2	25.9	54.6	9.8	1.6
Exotic															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	1.6	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--
All stands	1.6	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--
Nonstocked	28.7	14.9	13.8	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	1,647.6	--	2.6	0.9	10.6	25.7	36.7	58.7	95.9	89.8	192.1	348.7	522.9	207.0	56.0
Poletimber	2,104.5	--	2.9	8.0	19.8	39.6	64.5	150.6	148.1	139.6	235.8	428.0	597.7	206.4	63.5
Sapling & seedling	748.8	39.2	71.2	62.0	92.0	107.8	57.3	105.4	60.1	40.4	44.1	52.6	13.9	2.8	--
Nonstocked	28.7	14.9	13.8	--	--	--	--	--	--	--	--	--	--	--	--
All stands	4,529.6	54.1	90.5	70.9	122.4	173.1	158.5	314.7	304.1	269.8	472.0	829.3	1,134.5	416.2	119.5

Table 15.--Area of commercial forest land by stocking class of growing-stock trees and stand-size class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Stocking class (percent)	All stands	Stand-size class			
		Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Less than 16.7	28.7	--	--	--	28.7
16.7 to 60.9	242.1	58.9	83.9	99.3	--
61.0 to 100.9	1,558.9	553.7	692.4	312.8	--
101.0 to 133.9	2,223.2	828.2	1,128.4	266.6	--
134.0 or more	476.7	206.8	199.8	70.1	--
All classes	4,529.6	1,647.6	2,104.5	748.8	28.7

Table 16.--Area of commercial forest land by stocking class based on selected stand components, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Stocking class (percent)	Stocking classified in terms of				
	All live trees	Growing-stock trees	Desirable trees	Acceptable trees	Rough and rotten trees
0-10	2.9	15.4	4,384.4	15.4	1,936.9
11-20	7.8	24.5	108.1	24.5	1,401.2
21-30	20.1	37.6	24.7	39.2	763.8
31-40	21.4	30.2	10.8	30.2	286.5
41-50	42.3	71.4	--	78.1	95.6
51-60	62.0	92.0	1.6	119.9	27.7
61-70	75.3	228.3	--	222.0	9.7
71-80	149.1	293.4	--	302.1	1.6
81-90	256.5	460.6	--	499.2	2.6
91-100	325.8	576.7	--	629.4	1.5
101-110	479.6	737.1	--	739.8	--
111-120	652.7	718.7	--	697.0	1.2
121-130	835.0	637.2	--	639.8	1.3
131-140	745.7	394.7	--	316.1	--
141-150	610.7	169.1	--	143.6	--
151-160	234.0	42.7	--	33.3	--
161+	8.7	--	--	--	--
Total	4,529.6	4,529.6	4,529.6	4,529.6	4,529.6

Table 17.--Area of noncommercial forest land by ownership class, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Ownership class	All areas	Productive-reserved areas	Unproductive areas
National Forest	65.5	45.6[1/]	19.9
Bureau of Land Management	--	--	--
Indian	--	--	--
Miscellaneous federal	125.9	125.9	--
State	105.1	95.0	10.1
County and municipal	0.2	0.2	--
Forest industry	16.9	--	16.9
Farmer	0.2	--	0.2
Misc. private-corp.	7.8	--	7.8
Misc. private-indiv.	7.3	--	7.3
Total	328.9	266.7	62.2

[1/] Includes 22.9 thousand acres of productive-deferred.

Table 18.--Area of noncommercial forest land by forest type, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All areas	Productive-reserved areas[1/]	Unproductive areas
Jack pine	6.9	6.8	0.1
Red pine	3.1	1.4	1.7
White pine	1.2	1.2	--
Balsam fir	52.1	49.6	2.5
White spruce	6.3	5.3	1.0
Black spruce	27.1	14.0	13.1
Northern white-cedar	17.3	0.1	17.2
Tamarack	5.7	--	5.7
Oak-hickory	--	--	--
Elm-ash-soft maple	4.6	4.3	0.3
Maple-birch	110.8	108.7	2.1
Aspen	74.4	72.8	1.6
Paper birch	1.5	1.5	--
Exotic	--	--	--
Nonstocked	17.9	1.0	16.9
All types	328.9	266.7	62.2

[1/] Includes 22.9 thousand acres of productive-deferred.

Table 19.--Area of nonforest land with trees by forest type and land use, Western Upper Peninsula, Michigan, 1980

(In thousand acres)

Forest type	All uses	Land use							
		Cropland	Improved pasture	Wooded strips	Idle farmland	Marsh	Wind-breaks	Urban and other windbreaks	Wooded pasture
Jack pine	1.7	--	1.7	--	--	--	--	--	--
Red pine	--	--	--	--	--	--	--	--	--
White pine	--	--	--	--	--	--	--	--	--
Balsam fir	--	--	--	--	--	--	--	--	--
White spruce	--	--	--	--	--	--	--	--	--
Black spruce	1.6	--	--	--	--	1.6	--	--	--
Northern white-cedar	6.0	--	--	--	--	6.0	--	--	--
Tamarack	--	--	--	--	--	--	--	--	--
Oak-hickory	--	--	--	--	--	--	--	--	--
Elm-ash-soft maple	4.3	1.8	--	--	--	2.5	--	--	--
Maple-birch	7.2	--	7.2	--	--	--	--	--	--
Aspen	12.3	1.8	3.7	--	--	5.1	--	--	1.7
Paper birch	--	--	--	--	--	--	--	--	--
Exotic	--	--	--	--	--	--	--	--	--
All types	33.1	3.6	12.6	--	--	15.2	--	--	1.7

Table 20.--Number of all live trees on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS															
White pine	15,099	4,368	1,638	2,197	1,524	1,420	968	1,073	636	553	238	250	210	24	--
Red pine	28,766	12,217	7,226	4,203	2,643	842	629	459	285	120	109	17	16	--	--
Jack pine	28,892	5,208	5,990	7,385	5,661	2,862	1,147	428	181	25	3	2	--	--	--
White spruce	68,038	26,015	18,109	9,528	6,143	3,985	2,044	1,266	621	224	69	16	18	--	--
Black spruce	131,983	55,599	41,264	24,674	7,951	1,840	468	132	45	7	3	--	--	--	--
Balsam fir	556,092	315,682	142,925	61,734	24,285	8,344	2,505	459	143	10	--	--	5	--	--
Hemlock	47,924	13,227	7,638	5,375	4,998	4,845	4,380	3,127	2,108	1,058	594	331	217	26	--
Tamarack	25,222	9,304	8,547	4,570	1,763	756	133	82	57	6	2	2	--	--	--
Northern white-cedar	166,404	54,962	42,119	30,567	17,396	9,905	5,784	2,899	1,464	692	275	190	139	12	--
Other softwoods	1,688	1,602	--	45	29	--	7	--	5	--	--	--	--	--	--
Total	1,070,108	498,184	275,456	150,278	72,393	34,799	18,065	9,925	5,545	2,695	1,293	808	605	62	--
HARDWOODS															
Select white oaks	79	--	--	--	--	34	23	22	--	--	--	--	--	--	--
Select red oaks	16,523	4,255	3,703	2,446	1,940	1,647	978	787	402	191	89	45	36	4	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	132,595	58,861	28,130	17,125	11,200	6,381	3,669	2,800	1,810	1,063	650	361	425	109	11
Hard maple	983,864	578,735	210,288	94,658	46,726	23,570	11,842	7,317	4,977	3,001	1,451	591	613	95	--
Soft maple	401,474	193,852	98,548	54,010	29,205	13,313	6,389	3,171	1,696	698	312	134	132	13	1
Beech	413	324	--	31	38	--	11	--	9	--	--	--	--	--	--
Ash	132,737	82,070	28,868	11,033	5,337	2,681	1,564	731	307	104	27	13	2	--	--
Balsam poplar	17,732	8,888	2,921	2,184	1,420	965	664	362	163	82	46	21	13	3	--
Cottonwood	4	--	--	--	--	--	--	--	4	--	--	--	--	--	--
Bigtooth aspen	21,582	4,898	3,168	4,282	4,280	2,409	1,390	700	256	117	32	34	16	--	--
Quaking aspen	256,110	130,212	37,748	30,318	25,596	16,917	9,077	3,785	1,599	576	209	54	15	4	--
Basswood	50,040	11,369	11,102	10,153	8,221	4,696	2,429	1,052	573	250	120	47	24	4	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	38,444	19,089	7,940	5,307	3,580	1,653	521	265	47	27	15	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	52,103	21,240	11,977	7,592	5,004	2,737	1,701	995	386	222	142	45	40	21	1
Paper birch	90,126	25,150	20,527	18,823	13,986	7,039	3,050	953	388	124	44	26	12	4	--
Other hardwoods	1,046	760	162	37	27	9	23	10	18	--	--	--	--	--	--
Noncommercial species	126,971	95,271	22,764	6,182	1,899	623	142	71	4	4	11	--	--	--	--
Total	2,321,843	1,234,974	487,846	264,181	158,459	84,674	43,473	23,021	12,639	6,459	3,148	1,371	1,328	257	13
All species	3,391,951	1,733,158	763,302	414,459	230,852	119,473	61,538	32,946	18,184	9,154	4,441	2,179	1,933	319	13

Table 21.--Number of growing-stock trees on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS															
White pine	14,240	4,160	1,638	1,876	1,433	1,306	921	1,031	631	547	233	250	192	22	--
Red pine	28,646	12,218	7,227	4,202	2,557	827	614	459	285	117	109	15	16	--	--
Jack pine	28,214	4,897	5,990	7,273	5,586	2,769	1,097	412	167	18	3	2	--	--	--
White spruce	67,117	25,857	17,824	9,399	5,989	3,884	2,013	1,211	621	216	69	16	18	--	--
Black spruce	130,461	55,083	40,861	24,321	7,727	1,820	461	133	45	7	3	--	--	--	--
Balsam fir	543,406	307,881	140,893	59,893	23,663	8,053	2,440	440	134	4	--	--	5	--	--
Hemlock	43,151	13,227	7,317	4,193	4,022	3,900	3,686	2,805	1,960	967	551	289	210	24	--
Tamarack	24,155	8,974	8,547	4,198	1,480	703	119	71	53	6	2	2	--	--	--
Northern white-cedar	146,137	52,044	38,741	26,041	13,567	7,348	4,406	2,103	1,055	448	190	116	70	8	--
Other softwoods	1,523	1,442	--	45	29	--	7	--	--	--	--	--	--	--	--
Total	1,027,050	485,783	269,038	141,441	66,053	30,610	15,764	8,665	4,951	2,330	1,160	690	511	54	--
HARDWOODS															
Select white oaks	46	--	--	--	--	--	24	22	--	--	--	--	--	--	--
Select red oaks	15,464	4,255	3,371	2,080	1,872	1,535	928	740	376	178	57	39	31	2	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	111,404	52,308	24,599	13,048	8,885	4,884	2,647	2,155	1,294	763	398	204	179	32	8
Hard maple	902,767	534,214	195,095	85,732	41,339	20,460	9,956	6,535	4,482	2,646	1,278	502	457	71	--
Soft maple	370,995	180,827	92,764	49,338	26,465	11,415	5,179	2,648	1,410	535	243	96	65	10	--
Beech	393	323	--	31	34	--	--	--	5	--	--	--	--	--	--
Ash	125,112	77,228	28,013	10,285	4,705	2,387	1,443	662	253	94	27	13	2	--	--
Balsam poplar	17,196	8,684	2,921	2,035	1,361	901	627	345	159	79	46	21	14	3	--
Cottonwood	4	--	--	--	--	--	--	--	4	--	--	--	--	--	--
Bigtooth aspen	18,635	4,256	2,667	3,739	3,670	2,183	1,195	581	215	86	14	19	10	--	--
Quaking aspen	231,452	120,828	34,764	26,435	22,651	14,448	7,541	3,058	1,123	439	130	23	8	4	--
Basswood	45,055	9,722	10,123	9,027	7,761	4,347	2,212	959	517	232	103	30	19	3	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	31,618	16,987	5,658	4,042	3,031	1,312	304	218	43	13	10	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	46,223	17,594	11,017	7,214	4,649	2,562	1,514	895	363	199	128	40	32	15	1
Paper birch	82,345	24,049	17,930	17,122	12,875	6,379	2,707	836	323	75	25	14	10	--	--
Other hardwoods	205	--	162	37	--	--	6	--	--	--	--	--	--	--	--
Total	1,998,914	1,051,275	429,084	230,165	139,298	72,813	36,283	19,654	10,567	5,339	2,459	1,001	827	140	9
All species	3,025,964	1,537,058	698,122	371,606	205,351	103,423	52,047	28,319	15,518	7,669	3,619	1,691	1,338	194	9

Table 22.--Number of short-log trees on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS											
White pine	77	42	14	6	--	6	3	--	6	--	--
Red pine	16	--	16	--	--	--	--	--	--	--	--
Jack pine	88	51	26	4	--	7	--	--	--	--	--
White spruce	119	78	16	21	--	4	--	--	--	--	--
Black spruce	--	--	--	--	--	--	--	--	--	--	--
Balsam fir	154	93	48	7	--	6	--	--	--	--	--
Hemlock	827	438	190	85	37	38	14	20	4	1	--
Tamarack	3	--	--	--	3	--	--	--	--	--	--
Northern white-cedar	1,301	522	414	131	127	38	25	22	21	1	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	2,585	1,224	724	254	167	99	42	42	31	2	--
HARDWOODS											
Select white oaks	--	--	--	--	--	--	--	--	--	--	--
Select red oaks	94	--	24	24	17	3	17	4	5	--	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	941	--	303	192	174	66	88	39	54	25	--
Hard maple	1,410	--	599	306	209	127	63	33	61	12	--
Soft maple	789	--	391	187	88	51	27	14	30	1	--
Beech	13	--	9	--	4	--	--	--	--	--	--
Ash	76	--	55	12	9	--	--	--	--	--	--
Balsam poplar	29	--	25	--	4	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--
Bigtooth aspen	186	--	98	60	10	10	6	2	--	--	--
Quaking aspen	792	--	413	175	134	44	21	5	--	--	--
Basswood	165	--	93	17	27	7	10	8	2	1	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	118	--	88	17	--	13	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	241	--	161	50	4	17	6	--	3	--	--
Paper birch	275	--	186	29	23	18	11	7	--	1	--
Other hardwoods	5	--	--	5	--	--	--	--	--	--	--
Total	5,134	--	2,445	1,074	703	356	249	112	155	40	--
All species	7,719	1,224	3,169	1,328	870	455	291	154	186	42	--

Table 23.--Net volume of growing stock on commercial forest land by species group, Western Upper Peninsula, Michigan, 1966 and 1980

(In million cubic feet)

Species group	1966	1980
SOFTWOODS		
White pine	141.0	153.8
Red pine	42.4	73.7
Jack pine	63.6	104.8
White spruce	142.1	207.6
Black spruce	128.2	136.5
Balsam fir	328.4	405.5
Hemlock	287.5	281.5
Tamarack	21.2	34.9
Northern white-cedar	272.8	330.1
Other softwoods	--	0.3
Total	1,427.2	1,728.7
HARDWOODS		
Select white oak	--	0.8
Select red oak	101.1	85.1
Other red oak	--	--
Hickory	--	--
Yellow birch	340.3	321.6
Hard maple	1,210.5	1,404.7
Soft maple	361.1	628.5
Beech	0.6	0.5
Ash	104.8	130.8
Balsam poplar	18.5	42.8
Cottonwood	--	0.1
Bigtooth aspen	85.2	104.5
Quaking aspen	630.1	643.0
Basswood	113.1	209.2
Yellow-poplar	--	--
Black walnut	--	--
Black cherry	38.4	53.6
Butternut	--	--
Elm	144.8	148.2
Paper birch	177.1	282.8
Other hardwoods	4.3	0.2
Total	3,329.9	4,056.4
All species	4,757.1	5,785.1

Table 24.--Net volume of all live trees on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS													
White pine	157,521	4,509	7,030	12,288	12,763	22,782	19,534	23,158	12,510	17,779	20,493	4,675	--
Red pine	74,360	10,435	13,234	7,817	9,657	11,090	9,185	4,916	5,673	1,065	1,288	--	--
Jack pine	106,727	19,553	31,125	26,247	15,791	8,252	4,771	773	107	108	--	--	--
White spruce	210,118	25,110	35,472	42,126	34,863	32,283	22,083	10,625	4,244	1,282	2,030	--	--
Black spruce	137,774	63,551	42,541	18,188	7,782	3,501	1,644	347	220	--	--	--	--
Balsam fir	413,139	147,919	130,316	80,869	38,207	10,489	4,193	402	--	--	744	--	--
Hemlock	304,366	9,166	19,553	32,997	46,922	50,257	49,013	33,518	25,669	16,868	16,825	3,578	--
Tamarack	36,450	12,276	10,092	8,323	2,244	1,713	1,499	172	68	63	--	--	--
Northern white-cedar	384,992	64,630	71,459	67,155	62,274	43,193	30,923	18,300	9,920	7,934	7,898	1,306	--
Other softwoods	388	77	140	--	119	--	52	--	--	--	--	--	--
Total	1,825,835	357,226	360,962	296,010	230,622	183,560	142,897	92,211	58,411	45,099	49,278	9,559	--
HARDWOODS													
Select white oaks	1,138	--	--	369	382	387	--	--	--	--	--	--	--
Select red oaks	90,588	6,153	10,520	15,634	14,382	16,328	11,413	6,880	3,690	2,554	2,571	463	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	402,763	40,911	56,324	52,682	45,561	50,721	43,705	33,612	25,003	16,385	25,171	9,713	2,975
Hard maple	1,538,043	260,965	266,792	231,844	180,893	159,865	148,034	117,375	71,798	34,552	51,655	14,270	--
Soft maple	696,070	146,596	166,240	128,885	93,091	65,458	45,722	22,567	12,836	6,166	7,112	1,327	70
Beech	735	106	270	--	114	--	245	--	--	--	--	--	--
Ash	138,691	29,888	29,715	25,602	23,144	15,563	8,292	3,879	1,412	1,025	171	--	--
Balsam poplar	43,805	3,062	5,179	6,362	8,149	6,919	4,482	3,192	2,543	1,668	1,500	749	--
Cottonwood	73	--	--	--	--	--	73	--	--	--	--	--	--
Bigtooth aspen	115,419	12,872	26,277	25,069	21,230	14,904	7,258	4,079	1,197	1,637	896	--	--
Quaking aspen	717,089	90,935	157,303	174,059	139,386	79,855	42,380	20,695	8,852	2,143	1,016	465	--
Basswood	220,812	27,023	48,302	47,719	37,611	22,482	17,000	9,962	5,643	2,489	1,817	764	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	63,374	12,876	19,775	15,800	7,050	5,227	1,301	843	502	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	158,421	21,902	29,464	27,030	25,799	20,966	10,836	7,811	6,681	2,436	3,127	2,253	116
Paper birch	305,370	64,164	88,148	72,505	45,240	18,896	9,595	3,456	1,521	1,113	619	113	--
Other hardwoods	950	110	78	55	192	153	362	--	--	--	--	--	--
Noncommercial species	30,668	13,823	8,456	4,742	1,697	1,260	88	125	477	--	--	--	--
Total	4,524,009	731,386	912,843	828,357	643,921	478,984	350,786	234,476	142,155	72,168	95,655	30,117	3,161
All species	6,349,844	1,088,612	1,273,805	1,124,367	874,543	662,544	493,683	326,687	200,566	117,267	144,933	39,676	3,161

Table 25.--Net volume of timber on commercial forest land by class of timber and softwoods and hardwoods, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Class of timber	All species	Softwoods	Hardwoods
LIVE TREES			
Growing-stock trees			
Sawtimber			
Saw log portion	2,492,966	917,175	1,575,791
Upper stem portion	347,064	119,846	227,218
Subtotal	2,840,030	1,037,021	1,803,009
Poletimber	2,945,001	691,648	2,253,353
Total growing-stock	5,785,031	1,728,669	4,056,362
Cull trees			
Rough and rotten cull trees			
Sawtimber	195,661	44,523	151,138
Poletimber	245,774	26,541	219,233
Subtotal	441,435	71,064	370,371
Short-log cull trees	123,378	26,102	97,276
Total cull	564,813	97,166	467,647
TOTAL LIVE TREES	6,349,844	1,825,835	4,524,009
SALVABLE DEAD TREES	198,420	85,740	112,680
ALL CLASSES	6,548,264	1,911,575	4,636,689

Table 26.--Net volume of growing-stock, sawtimber, short-log, and rough and rotten trees on commercial forest land by individual species, Western Upper Peninsula, Michigan, 1980

Species	Total all live	Growing stock	Short-log cull	Rough and rotten cull	Sawtimber
	- - - - - - - -Thousand cubic feet- - - - - - - -				Thousand board feet 1/
SOFTWOODS					
White pine	157,521	153,771	1,014	2,736	780,033
Red pine	74,360	73,688	143	529	279,874
Jack pine	106,727	104,739	833	1,155	276,692
Scotch pine	--	--	--	--	--
White spruce	210,118	207,633	992	1,493	745,345
Norway spruce	217	217	--	--	--
Engelmann spruce	--	--	--	--	--
Black spruce	137,774	136,530	--	1,244	153,343
Balsam fir	413,139	405,475	1,289	6,375	610,899
Hemlock	304,366	281,531	8,360	14,475	1,444,202
Tamarack	36,450	34,916	60	1,474	61,261
Northern white-cedar	384,992	330,049	13,411	41,532	994,377
Eastern redcedar	171	120	--	51	589
Total	1,825,835	1,728,669	26,102	71,064	5,346,615
HARDWOODS					
White oak	--	--	--	--	--
Bur oak	1,138	769	--	369	3,693
Swamp white oak	--	--	--	--	--
Northern red oak	90,588	85,076	2,266	3,246	298,531
Shellbark hickory	--	--	--	--	--
Yellow birch	402,763	321,572	21,050	60,141	1,049,376
Black maple	116	116	--	--	--
Sugar maple	1,537,927	1,404,594	31,141	102,192	4,009,886
Red maple	693,953	626,833	13,450	53,670	1,160,841
Silver maple	2,117	1,676	143	298	7,868
American beech	735	488	202	45	821
White ash	31,279	30,163	475	641	68,007
Black ash	104,440	97,878	587	5,975	200,287
Green ash	2,972	2,749	--	223	10,030
Balsam poplar	43,805	42,799	392	614	153,205
Paper birch	305,370	282,834	3,969	18,567	376,599
Bigtooth aspen	115,419	104,484	2,568	8,367	242,428
Quaking aspen	717,089	643,017	12,396	61,676	1,360,347
Basswood	220,812	209,228	3,042	8,542	505,144
American elm	156,938	146,695	3,832	6,411	391,201
Slippery elm	1,199	1,199	--	--	3,569
Rock elm	284	284	--	--	1,555
Black cherry	63,374	53,658	1,706	8,010	55,406
Boxelder	853	177	57	619	432
Sweet birch	--	--	--	--	--
Eastern cottonwood	73	73	--	--	371
Black willow	97	--	--	97	--
Ohio buckeye	--	--	--	--	--
Flowering dogwood	--	--	--	--	--
Black locust	--	--	--	--	--
Noncommercial species	30,668	--	--	30,668	--
Total	4,524,009	4,056,362	97,276	370,371	9,899,597
All species	6,349,844	5,785,031	123,378	441,435	15,246,212

1/International 1/4-inch rule.

Table 27.--Net volume of noncommercial species (nongrowing-stock volume) on commercial forest land by individual species, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species	Nongrowing-stock (rough tree) volume
Striped maple	681
Mountain maple	2,240
Ailanthus	--
American hornbeam	114
Eastern hophornbeam	24,888
Eastern redbud	--
Hawthorn	--
Apple	121
Pin cherry	704
Chokecherry	716
Mountain ash	1,204
Peachleaf willow	--
Diamond willow	--
All species	30,668

Table 28.--Net volume of growing stock on commercial forest land by county and species group, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
SOFTWOODS									
White pine	153,771	11,690	7,961	6,184	11,644	27,923	13,780	57,551	17,038
Red pine	73,688	3,531	5,135	7,845	11,032	9,427	474	26,769	9,475
Jack pine	104,739	6,425	1,508	6,375	17,715	7,988	--	54,887	9,841
White spruce	207,633	23,514	12,721	23,665	17,357	35,308	12,968	44,848	37,252
Black spruce	136,530	17,149	16,388	14,777	6,174	27,640	5,791	43,826	4,785
Balsam fir	405,475	41,352	35,583	59,181	36,395	72,293	22,172	87,209	51,290
Hemlock	281,531	58,700	1,641	49,862	32,689	23,276	274	69,212	45,877
Tamarack	34,916	4,296	4,784	3,243	3,498	10,290	397	7,599	809
Northern white-cedar	330,049	43,425	40,428	40,629	28,043	25,712	49,271	78,037	24,504
Other softwoods	337	--	--	158	24	27	--	77	51
Total	1,728,669	210,082	126,149	211,919	164,571	239,884	105,127	470,015	200,922
HARDWOODS									
Select white oaks	769	50	--	167	92	77	--	--	383
Select red oaks	85,076	3,140	4,423	6,543	10,178	6,277	17,007	33,636	3,872
Other red oaks	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--
Yellow birch	321,572	65,784	5,852	51,438	51,616	35,135	15,604	50,800	45,343
Hard maple	1,404,710	209,963	58,492	199,816	223,250	185,935	62,350	268,226	196,678
Soft maple	628,509	112,115	13,579	60,607	102,832	54,797	38,908	164,385	81,286
Beech	488	--	--	--	--	--	--	488	--
Ash	130,790	12,967	8,468	38,200	13,234	8,710	1,393	10,946	36,872
Balsam poplar	42,799	2,650	20,809	210	353	6,693	460	7,346	4,278
Cottonwood	73	--	--	--	--	73	--	--	--
Bigtooth aspen	104,484	8,724	8,524	7,723	9,823	14,549	674	39,162	15,305
Quaking aspen	643,017	37,744	63,209	88,450	74,034	107,243	18,749	90,446	163,142
Basswood	209,228	8,365	30,521	40,106	25,313	30,737	1,388	18,844	53,954
Yellow-poplar	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Black cherry	53,658	11,354	2,549	9,010	4,656	11,589	150	10,305	4,045
Butternut	--	--	--	--	--	--	--	--	--
Elm	148,178	10,152	12,947	32,884	16,139	29,633	925	12,025	33,473
Paper birch	282,834	25,958	27,995	16,807	22,090	54,642	29,640	87,841	17,861
Other hardwoods	177	--	--	110	--	--	--	--	67
Total	4,056,362	508,966	257,368	552,071	553,610	546,090	187,248	794,450	656,559
All species	5,785,031	719,048	383,517	763,990	718,181	785,974	292,375	1,264,465	857,481

Table 29.--Net volume of sawtimber on commercial forest land by county and species group, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
SOFTWOODS									
White pine	780,033	62,081	39,185	31,809	60,937	140,182	72,749	286,654	86,436
Red pine	279,874	19,026	20,152	15,209	42,026	33,862	1,086	128,220	20,293
Jack pine	276,692	8,047	3,475	10,655	32,334	19,407	--	186,395	16,379
White spruce	745,345	92,445	42,080	91,333	59,238	132,524	47,743	156,655	123,327
Black spruce	153,343	19,405	11,519	17,879	8,868	31,630	13,468	45,076	5,498
Balsam fir	610,899	58,749	50,341	81,480	63,311	114,526	36,258	124,556	81,678
Hemlock	1,444,202	310,370	7,789	248,181	166,553	124,563	1,487	357,652	227,607
Tamarack	61,261	10,223	2,303	5,362	10,223	21,647	1,083	9,234	1,186
Northern white-cedar	994,377	163,114	69,513	136,366	101,157	77,832	155,233	204,497	86,665
Other softwoods	589	--	--	589	--	--	--	--	--
Total	5,346,615	743,460	246,357	638,863	544,647	696,173	329,107	1,498,939	649,069
HARDWOODS									
Select white oaks	3,693	241	--	803	440	371	--	--	1,838
Select red oaks	298,531	9,500	18,140	19,398	41,323	20,547	70,995	105,533	13,095
Other red oaks	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--
Yellow birch	1,049,376	247,536	12,036	148,891	141,970	120,608	59,976	195,806	122,553
Hard maple	4,009,886	700,785	67,583	535,635	664,036	499,633	171,170	781,680	589,364
Soft maple	1,168,709	264,384	12,024	108,544	198,769	115,743	87,305	266,336	115,604
Beech	821	--	--	--	--	--	--	821	--
Ash	278,324	34,684	12,310	86,351	26,589	16,842	3,503	19,504	78,541
Balsam poplar	153,205	12,451	78,033	1,261	1,201	16,018	--	24,278	19,963
Cottonwood	371	--	--	--	--	371	--	--	--
Bigtooth aspen	242,428	27,062	22,346	21,943	25,895	33,967	1,407	78,829	30,979
Quaking aspen	1,360,347	97,251	101,347	180,969	195,197	217,565	44,873	186,731	336,414
Basswood	505,144	25,304	79,143	74,694	71,722	59,520	5,958	75,179	113,624
Yellow-poplar	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Black cherry	55,406	11,334	2,469	8,175	6,779	10,468	--	11,359	4,822
Butternut	--	--	--	--	--	--	--	--	--
Elm	396,325	30,081	28,820	83,238	50,395	79,819	4,979	37,621	81,372
Paper birch	376,599	49,697	18,345	17,759	26,263	69,993	51,580	123,692	19,270
Other hardwoods	432	--	--	--	--	--	--	--	432
Total	9,899,597	1,510,310	452,596	1,287,661	1,450,579	1,261,465	501,746	1,907,369	1,527,871
All species	15,246,212	2,253,770	698,953	1,926,524	1,995,226	1,957,638	830,853	3,406,308	2,176,940

[1/] International 1/4-inch rule.

Table 30.--Net volume of growing stock on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS													
White pine	153,771	3,872	6,767	11,567	12,403	22,356	19,492	22,995	12,373	17,779	19,801	4,366	--
Red pine	73,688	10,434	12,897	7,754	9,514	11,090	9,186	4,855	5,673	997	1,288	--	--
Jack pine	104,739	19,369	30,918	25,692	15,317	8,083	4,559	586	107	108	--	--	--
White spruce	207,633	24,911	35,020	41,507	34,656	31,390	22,082	10,511	4,244	1,282	2,030	--	--
Black spruce	136,530	63,104	41,867	18,136	7,711	3,501	1,644	347	220	--	--	--	--
Balsam fir	405,475	144,988	128,220	79,214	37,742	10,300	4,081	186	--	--	744	--	--
Hemlock	281,531	7,755	16,691	28,285	42,599	47,354	47,015	31,681	24,546	15,844	16,436	3,325	--
Tamarack	34,916	11,801	9,561	8,115	2,147	1,550	1,438	172	68	64	--	--	--
Northern white-cedar	330,049	60,142	63,114	57,813	53,724	36,459	25,674	13,827	7,908	5,717	4,761	910	--
Other softwoods	337	77	140	--	120	--	--	--	--	--	--	--	--
Total	1,728,669	346,453	345,195	278,083	215,933	172,083	135,171	85,160	55,139	41,791	45,060	8,601	--
HARDWOODS													
Select white oaks	769	--	--	--	382	387	--	--	--	--	--	--	--
Select red oaks	85,076	5,417	10,199	14,987	13,998	15,710	10,890	6,547	2,600	2,255	2,253	220	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	321,572	36,081	48,972	44,625	36,799	42,906	34,719	27,245	18,155	11,311	14,162	4,026	2,571
Hard maple	1,404,710	242,846	244,189	210,180	160,430	148,042	138,458	108,258	66,264	30,985	43,569	11,489	--
Soft maple	628,509	137,322	155,211	116,081	80,818	58,293	40,455	19,031	11,024	5,068	4,103	1,103	--
Beech	488	106	243	--	--	--	139	--	--	--	--	--	--
Ash	130,790	28,643	27,275	23,866	22,030	14,873	7,799	3,696	1,412	1,025	171	--	--
Balsam poplar	42,799	2,960	5,149	6,180	7,769	6,749	4,393	3,138	2,543	1,669	1,500	749	--
Cottonwood	73	--	--	--	--	--	73	--	--	--	--	--	--
Bigtooth aspen	104,484	12,083	23,429	23,931	19,429	13,414	6,555	3,332	628	1,054	629	--	--
Quaking aspen	643,017	83,633	144,812	159,521	124,415	69,933	34,157	17,543	6,519	1,406	613	465	--
Basswood	209,228	24,961	46,858	45,752	35,487	21,555	16,089	9,633	5,163	1,743	1,499	488	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	53,658	10,952	17,501	13,665	4,843	4,583	1,202	472	440	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	148,178	21,176	28,106	25,556	23,587	19,373	10,427	7,178	6,152	2,264	2,608	1,634	117
Paper birch	282,834	60,269	83,065	67,441	41,216	17,258	8,634	2,569	1,077	711	594	--	--
Other hardwoods	177	110	--	--	67	--	--	--	--	--	--	--	--
Total	4,056,362	666,559	835,009	751,785	571,270	433,076	313,990	208,642	121,977	59,491	71,701	20,174	2,688
All species	5,785,031	1,013,012	1,180,204	1,029,868	787,203	605,159	449,161	293,802	177,116	101,282	116,761	28,775	2,688

Table 31.--Net volume of sawtimber on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS											
White pine	780,033	59,608	64,824	116,312	105,973	123,838	68,608	101,472	113,220	26,178	--
Red pine	279,874	41,996	52,007	60,280	51,325	27,802	32,496	6,002	7,966	--	--
Jack pine	276,692	129,774	76,755	41,758	24,183	3,076	574	572	--	--	--
White spruce	745,345	205,601	172,609	157,331	113,341	55,384	22,434	7,135	11,510	--	--
Black spruce	153,343	84,525	37,973	18,448	9,119	1,964	1,314	--	--	--	--
Balsam fir	610,899	355,378	178,094	51,283	20,680	1,036	--	--	4,428	--	--
Hemlock	1,444,202	157,263	237,255	262,130	265,476	178,485	138,342	90,312	96,149	18,790	--
Tamarack	61,261	34,635	10,368	7,990	7,032	708	265	263	--	--	--
Northern white-cedar	994,377	270,683	255,108	174,601	126,350	68,993	39,731	29,179	24,903	4,829	--
Other softwoods	589	--	589	--	--	--	--	--	--	--	--
Total	5,346,615	1,339,463	1,085,582	890,133	723,479	461,286	303,764	234,935	258,176	49,797	--
HARDWOODS											
Select white oaks	3,693	--	1,952	1,741	--	--	--	--	--	--	--
Select red oaks	298,531	--	71,942	85,441	61,213	37,711	15,415	13,180	12,491	1,138	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	1,049,376	--	200,164	237,069	196,088	154,491	98,245	63,259	72,589	17,555	9,916
Hard maple	4,009,886	--	827,290	837,783	814,185	649,648	394,526	182,032	243,019	61,403	--
Soft maple	1,168,709	--	384,016	318,763	233,475	113,072	64,724	28,086	21,122	5,451	--
Beech	821	--	--	--	821	--	--	--	--	--	--
Ash	278,324	--	116,256	81,966	43,598	21,422	7,989	6,000	1,093	--	--
Balsam poplar	153,205	--	42,823	37,268	23,748	16,740	13,600	8,331	7,220	3,475	--
Cottonwood	371	--	--	--	371	--	--	--	--	--	--
Bigtooth aspen	242,428	--	100,040	72,901	37,719	19,185	3,520	5,714	3,349	--	--
Quaking aspen	1,360,347	--	650,303	377,906	186,264	95,702	37,148	7,603	3,207	2,214	--
Basswood	505,144	--	181,894	121,048	95,157	56,295	29,270	9,869	8,611	3,000	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	55,406	--	24,102	21,411	5,629	2,219	2,045	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	396,325	--	136,112	107,178	54,551	36,184	30,911	10,619	12,413	7,790	567
Paper birch	376,599	--	217,490	90,841	43,547	12,895	5,382	3,427	3,017	--	--
Other hardwoods	432	--	432	--	--	--	--	--	--	--	--
Total	9,899,597	--	2,954,816	2,391,316	1,796,366	1,215,564	702,775	338,120	388,131	102,026	10,483
All species	15,246,212	1,339,463	4,040,398	3,281,449	2,519,845	1,676,850	1,006,539	573,055	646,307	151,823	10,483

[1/] International 1/4-inch rule.

Table 32.--Net volume of growing stock on commercial forest land by species group and forest type, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All types	Forest type						
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	153,771	1,251	7,427	49,678	16,770	3,408	4,524	4,214
Red pine	73,688	4,455	43,499	4,656	3,857	142	3,556	137
Jack pine	104,739	83,117	2,538	939	697	428	5,121	--
White spruce	207,633	189	804	5,481	50,915	23,881	4,150	7,971
Black spruce	136,530	1,121	1,235	1,894	21,972	1,874	68,791	17,224
Balsam fir	405,475	878	2,197	5,006	139,620	4,095	14,796	25,746
Hemlock	281,531	--	--	531	5,499	--	643	424
Tamarack	34,916	--	--	96	4,362	338	11,031	4,230
Northern white-cedar	330,049	--	--	793	33,214	1,838	20,888	158,987
Other softwoods	337	--	140	--	--	--	77	--
Total	1,728,669	91,011	57,840	69,074	276,906	36,004	133,577	218,933
HARDWOODS								
Select white oaks	769	--	--	--	--	--	--	--
Select red oaks	85,076	1,469	1,182	585	498	--	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	321,572	--	--	91	9,049	104	1,393	4,740
Hard maple	1,404,710	--	574	2,618	5,276	1,081	288	2,606
Soft maple	628,509	176	1,097	4,125	26,238	1,183	2,476	7,767
Beech	488	--	--	--	--	--	--	--
Ash	130,790	--	--	--	2,628	--	1,787	3,294
Balsam poplar	42,799	--	90	--	5,425	34	289	2,603
Cottonwood	73	--	--	--	--	--	--	--
Bigtooth aspen	104,484	635	3,080	--	1,488	--	99	122
Quaking aspen	643,017	4,973	4,738	6,404	29,609	12,261	7,095	3,019
Basswood	209,228	--	--	206	193	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	53,658	--	--	--	3,245	75	165	279
Butternut	--	--	--	--	--	--	--	--
Elm	148,178	--	--	96	4,103	314	--	209
Paper birch	282,834	235	2,891	11,225	24,845	1,625	6,456	13,758
Other hardwoods	177	--	--	--	--	--	--	--
Total	4,056,362	7,488	13,652	25,350	112,597	16,677	20,048	38,397
All species	5,785,031	98,499	71,492	94,424	389,503	52,681	153,625	257,330

(Table 32 continued on next page)

(Table 32 continued)

Species group	Forest type							
	Tamarack	Oak hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	342	1,012	1,891	42,643	15,881	4,674	--	56
Red pine	--	1,358	--	877	9,667	1,484	--	--
Jack pine	--	--	--	2,693	6,078	3,025	--	103
White spruce	53	166	9,006	65,909	32,209	6,899	--	--
Black spruce	2,449	234	2,989	7,098	7,374	2,275	--	--
Balsam fir	1,086	173	15,528	128,614	54,977	12,759	--	--
Hemlock	--	--	7,488	264,482	1,718	746	--	--
Tamarack	9,935	--	527	--	2,864	1,533	--	--
Northern white-cedar	1,397	--	23,063	76,569	7,347	5,953	--	--
Other softwoods	--	--	--	120	--	--	--	--
Total	15,262	2,943	60,492	589,005	138,115	39,348	--	159
HARDWOODS								
Select white oaks	--	--	--	--	769	--	--	--
Select red oaks	--	19,537	563	47,162	10,513	3,567	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	--	306	12,895	288,270	3,926	798	--	--
Hard maple	--	3,757	8,002	1,346,656	26,195	7,657	--	--
Soft maple	--	2,055	34,652	485,081	46,429	17,230	--	--
Beech	--	--	--	488	--	--	--	--
Ash	--	121	49,472	65,368	7,394	726	--	--
Balsam poplar	319	--	1,043	6,626	25,227	1,143	--	--
Cottonwood	--	--	--	--	73	--	--	--
Bigtooth aspen	--	2,180	--	25,436	65,577	5,867	--	--
Quaking aspen	694	646	6,353	185,057	366,545	15,406	--	217
Basswood	--	--	1,927	202,087	4,517	298	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	--	583	44,041	4,783	487	--	--
Butternut	--	--	--	--	--	--	--	--
Elm	--	--	12,047	121,431	9,522	456	--	--
Paper birch	339	1,895	4,903	62,022	49,118	103,400	--	122
Other hardwoods	--	--	67	110	--	--	--	--
Total	1,352	30,497	132,507	2,879,835	620,588	157,035	--	339
All species	16,614	33,440	192,999	3,468,840	758,703	196,383	--	498

Table 33.--Net volume of sawtimber on commercial forest land by species group and forest type, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	780,033	6,454	35,550	244,152	83,369	16,274	23,412	24,913
Red pine	279,874	19,679	143,354	24,903	19,914	756	14,147	698
Jack pine	276,692	223,371	6,307	3,891	1,473	1,165	12,929	--
White spruce	745,345	909	1,637	18,686	168,137	60,139	17,545	34,552
Black spruce	153,343	2,045	--	3,537	32,158	2,869	47,860	27,520
Balsam fir	610,899	4,368	3,649	5,977	210,862	7,168	18,127	22,242
Hemlock	1,444,202	--	--	3,122	26,336	--	3,090	2,505
Tamarack	61,261	--	--	495	10,346	1,171	11,349	3,836
Northern white-cedar	994,377	--	--	1,911	100,278	5,051	69,675	421,177
Other softwoods	589	--	--	--	--	--	--	--
Total	5,346,615	256,826	190,497	306,674	652,873	94,593	218,134	537,443
HARDWOODS								
Select white oaks	3,693	--	--	--	--	--	--	--
Select red oaks	298,531	1,293	4,580	774	--	--	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	1,049,376	--	--	--	34,122	--	5,897	18,858
Hard maple	4,009,886	--	--	3,673	15,336	1,491	910	5,340
Soft maple	1,168,709	--	699	5,118	45,430	--	1,030	13,029
Beech	821	--	--	--	--	--	--	--
Ash	278,324	--	--	--	3,190	--	786	3,885
Balsam poplar	153,205	--	511	--	16,719	--	1,019	6,175
Cottonwood	371	--	--	--	--	--	--	--
Bigtooth aspen	242,428	1,454	2,773	--	7,368	--	--	684
Quaking aspen	1,360,347	--	2,994	9,281	57,719	8,291	13,752	9,394
Basswood	505,144	--	--	--	432	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	55,406	--	--	--	2,127	--	--	456
Butternut	--	--	--	--	--	--	--	--
Elm	396,325	--	--	--	4,786	604	--	390
Paper birch	376,599	667	3,530	20,671	33,951	1,315	9,428	24,310
Other hardwoods	432	--	--	--	--	--	--	--
Total	9,899,597	3,414	15,087	39,517	221,180	11,701	32,822	82,521
All species	15,246,212	260,240	205,584	346,191	874,053	106,294	250,956	619,964

(Table 33 continued on next page)

[1/] International 1/4-inch rule.

(Table 33 continued)

Species group	Forest type							
	Tamarack	Oak hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	2,024	4,980	9,775	223,227	82,401	23,502	--	--
Red pine	--	7,344	--	4,501	36,761	7,817	--	--
Jack pine	--	--	--	1,831	12,014	13,711	--	--
White spruce	--	840	37,205	268,413	114,637	22,645	--	--
Black spruce	1,834	696	6,240	16,692	9,886	2,006	--	--
Balsam fir	1,503	--	19,423	221,391	83,471	12,718	--	--
Hemlock	--	--	37,506	1,361,187	7,101	3,355	--	--
Tamarack	24,009	--	2,377	--	7,031	647	--	--
Northern white-cedar	3,695	--	70,373	290,864	18,348	13,005	--	--
Other softwoods	--	--	--	589	--	--	--	--
Total	33,065	13,860	182,899	2,388,695	371,650	99,406	--	--
HARDWOODS								
Select white oaks	--	--	--	--	3,693	--	--	--
Select red oaks	--	68,034	1,564	185,151	29,869	7,266	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	--	670	40,629	945,897	2,077	1,226	--	--
Hard maple	--	2,079	16,053	3,931,778	25,594	7,632	--	--
Soft maple	--	682	74,076	994,681	24,152	9,812	--	--
Beech	--	--	--	821	--	--	--	--
Ash	--	675	122,793	135,112	11,266	617	--	--
Balsam poplar	1,430	--	1,498	24,716	96,302	4,835	--	--
Cottonwood	--	--	--	--	371	--	--	--
Bigtooth aspen	--	4,279	--	87,215	126,156	12,499	--	--
Quaking aspen	2,090	2,233	8,177	512,984	694,024	39,408	--	--
Basswood	--	--	4,370	496,682	3,660	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	--	986	47,212	4,625	--	--	--
Butternut	--	--	--	--	--	--	--	--
Elm	--	--	38,936	341,274	9,036	1,299	--	--
Paper birch	--	3,582	8,903	132,833	55,307	82,102	--	--
Other hardwoods	--	--	432	--	--	--	--	--
Total	3,520	82,234	318,417	7,836,356	1,086,132	166,696	--	--
All species	36,585	96,094	501,316	10,225,051	1,457,782	266,102	--	--

Table 34.--Net volume of growing stock on commercial forest land by species group and ownership class, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	153,771	33,494	--	--	--	25,230	645	32,068	5,073	29,343	27,918
Red pine	73,688	29,079	--	--	--	12,441	--	9,265	484	9,636	12,783
Jack pine	104,739	41,016	--	--	--	24,637	7,153	8,386	--	7,164	16,383
White spruce	207,633	42,347	--	112	336	33,184	1,097	58,970	5,784	34,502	31,301
Black spruce	136,530	22,062	--	94	--	34,923	3,182	34,786	2,261	13,791	25,431
Balsam fir	405,475	90,119	--	1,820	106	66,336	4,672	105,480	12,404	51,441	73,097
Hemlock	281,531	46,140	--	--	2,926	19,389	2,455	117,426	10,546	33,073	49,576
Tamarack	34,916	4,750	--	--	--	10,163	628	9,421	1,148	3,016	5,790
Northern white-cedar	330,049	40,363	--	--	265	60,974	7,672	107,638	6,944	65,089	41,104
Other softwoods	337	140	--	--	--	--	--	--	--	120	77
Total	1,728,669	349,510	--	2,026	3,633	287,277	27,504	483,440	44,644	247,175	283,460
HARDWOODS											
Select white oaks	769	769	--	--	--	--	--	--	--	--	--
Select red oaks	85,076	5,046	--	--	258	13,784	--	21,619	3,718	20,688	19,963
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	321,572	57,113	--	107	3,879	26,141	4,751	121,308	9,686	50,190	48,397
Hard maple	1,404,710	262,451	--	--	7,239	104,263	23,436	488,150	60,924	227,258	230,989
Soft maple	628,509	96,640	--	--	5,829	68,187	6,661	179,001	31,416	104,088	136,687
Beech	488	--	--	--	--	265	--	223	--	--	--
Ash	130,790	35,522	--	--	423	12,976	6,681	39,090	4,273	15,021	16,804
Balsam poplar	42,799	966	--	--	--	16,946	--	9,604	1,619	2,085	11,579
Cottonwood	73	--	--	--	--	--	--	--	73	--	--
Bigtooth aspen	104,484	17,697	--	--	3,682	17,813	2,298	13,365	2,789	19,629	27,211
Quaking aspen	643,017	159,197	--	--	4,734	90,346	13,662	107,476	25,597	95,787	146,218
Basswood	209,228	53,204	--	--	275	19,830	4,040	43,852	14,375	32,893	40,759
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	53,658	8,671	--	--	--	5,298	1,384	20,492	3,622	5,640	8,551
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	148,178	31,207	--	--	216	15,342	3,768	34,349	13,656	19,271	30,369
Paper birch	282,834	46,008	--	343	--	38,436	2,526	70,169	13,258	48,958	63,136
Other hardwoods	177	--	--	--	--	--	--	--	--	67	110
Total	4,056,362	774,491	--	450	26,535	429,627	69,207	1,148,698	185,006	641,575	780,773
All species	5,785,031	1,124,001	--	2,476	30,168	716,904	96,711	1,632,138	229,650	888,750	1,064,233

Table 35.--Net volume of sawtimber on commercial forest land by species group and ownership class, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	780,033	168,585	--	--	--	127,912	2,672	159,520	25,018	154,120	142,206
Red pine	279,874	69,803	--	--	--	55,402	--	44,178	1,360	50,180	58,951
Jack pine	276,692	72,215	--	--	--	90,740	19,055	18,394	--	19,119	57,169
White spruce	745,345	160,352	--	547	709	121,012	3,679	208,573	19,114	128,150	103,209
Black spruce	153,343	17,622	--	--	--	39,313	5,469	40,017	2,349	23,730	24,843
Balsam fir	610,899	142,262	--	5,406	--	98,480	5,888	144,799	13,709	82,091	118,264
Hemlock	1,444,202	236,632	--	--	15,318	103,626	10,533	617,557	54,930	166,276	239,330
Tamarack	61,261	4,567	--	--	--	15,155	1,460	20,365	1,891	8,072	9,751
Northern white-cedar	994,377	129,859	--	--	1,126	135,405	27,854	348,233	12,430	230,327	109,143
Other softwoods	589	--	--	--	--	--	--	--	--	589	--
Total	5,346,615	1,001,897	--	5,953	17,153	787,045	76,610	1,601,636	130,801	862,654	862,866
HARDWOODS											
Select white oaks	3,693	3,693	--	--	--	--	--	--	--	--	--
Select red oaks	298,531	20,095	--	--	1,410	45,570	--	75,463	15,591	72,191	68,211
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	1,049,376	165,080	--	591	12,291	87,051	13,179	445,122	29,172	152,879	144,011
Hard maple	4,009,886	838,278	--	--	14,572	266,446	48,267	1,601,705	111,064	635,631	493,923
Soft maple	1,168,709	163,865	--	--	5,783	108,297	15,350	404,014	52,306	185,118	233,976
Beech	821	--	--	--	--	821	--	--	--	--	--
Ash	278,324	65,693	--	--	1,855	25,861	11,210	101,302	5,421	39,958	27,024
Balsam poplar	153,205	5,799	--	--	--	70,207	--	27,362	4,821	3,972	41,044
Cottonwood	371	--	--	--	--	--	--	--	371	--	--
Bigtooth aspen	242,428	31,241	--	--	9,897	32,480	7,396	34,979	8,654	43,901	73,880
Quaking aspen	1,360,347	332,869	--	--	7,617	189,449	26,325	222,969	53,902	230,459	296,757
Basswood	505,144	110,954	--	--	1,516	53,255	4,017	118,720	37,350	78,605	100,727
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	55,406	11,114	--	--	--	6,712	750	19,969	3,357	7,103	6,401
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	396,325	68,412	--	--	651	41,788	9,797	99,559	38,992	55,677	81,449
Paper birch	376,599	51,524	--	1,156	--	40,199	3,358	113,085	10,779	76,829	79,669
Other hardwoods	432	--	--	--	--	--	--	--	--	432	--
Total	9,899,597	1,868,617	--	1,747	55,592	968,136	139,649	3,264,249	371,780	1,582,755	1,647,072
All species	15,246,212	2,870,514	--	7,700	72,745	1,755,181	216,259	4,865,886	502,581	2,445,409	2,509,938

[1/]International 1/4-inch rule.

Table 36.--Net volume of growing stock on commercial forest land by forest type and stand-age class, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Forest type	All classes	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	98,499	--	1,559	11,567	9,255	32,790	29,341	5,422	4,612	2,380	1,573	--	--	--
Red pine	71,492	--	2,983	11,001	13,790	--	1,562	13,838	2,179	7,521	1,377	15,296	1,945	--
White pine	94,424	--	--	1,687	1,558	1,572	--	33,728	4,481	21,874	10,077	7,966	8,283	3,198
Balsam fir	389,503	10,987	10,828	16,617	31,402	76,164	63,194	50,732	47,569	26,927	21,203	24,194	3,380	6,306
White spruce	52,681	1,738	1,004	--	16,686	4,180	8,883	4,565	1,806	--	--	13,819	--	--
Black spruce	153,625	8,475	8,261	12,754	11,107	16,184	26,504	24,651	9,258	--	4,193	16,727	10,661	4,850
Northern white-cedar	257,330	1,031	3,638	3,781	1,612	11,410	23,560	30,153	30,333	32,982	18,621	51,211	24,735	24,263
Tamarack	16,614	1,801	2,270	1,709	69	2,116	3,794	389	--	--	2,492	--	--	1,974
Oak-hickory	33,440	--	--	1,117	2,740	7,160	--	5,203	--	2,897	6,202	4,995	3,126	--
Elm-ash-soft maple	192,999	4,985	9,649	3,530	8,883	10,596	14,811	16,559	18,284	21,565	11,251	23,246	26,519	23,121
Maple-birch	3,468,840	37,635	42,756	42,609	153,387	521,681	534,345	227,894	234,821	305,296	343,581	586,042	290,797	147,996
Aspen	758,703	33,209	28,600	21,039	102,778	178,303	188,152	64,698	85,492	34,853	6,424	15,155	--	--
Paper birch	196,383	2,578	4,583	2,557	11,828	23,099	65,329	34,052	18,749	12,341	10,479	--	8,160	2,628
Exotic	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	498	173	108	--	217	--	--	--	--	--	--	--	--	--
All types	5,785,031	102,612	116,239	129,968	365,312	885,255	959,475	511,884	457,584	468,636	437,473	758,651	377,606	214,336

Table 37.--Net volume of sawtimber on commercial forest land by forest type and stand-age class, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Forest type	All classes	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	260,240	--	5,429	10,070	14,164	74,451	110,524	20,895	17,409	948	6,350	--	--	--
Red pine	205,584	--	6,332	10,073	20,519	--	4,664	48,362	7,358	24,774	5,619	71,971	5,912	--
White pine	346,191	--	--	2,898	3,743	2,899	--	115,551	18,396	81,861	40,784	33,073	34,441	12,545
Balsam fir	874,053	17,608	14,071	28,924	52,962	149,495	120,002	108,183	126,929	75,814	68,791	76,873	10,729	23,672
White spruce	106,294	8,026	1,253	--	7,883	10,933	19,053	9,233	5,909	--	--	44,004	--	--
Black spruce	250,956	10,354	9,309	9,371	13,212	23,602	22,313	37,888	7,272	--	15,027	56,370	31,922	14,316
Northern white-cedar	619,964	1,246	3,653	5,418	1,388	14,568	38,943	45,231	48,956	76,314	55,782	161,152	80,991	86,322
Tamarack	36,585	5,865	5,804	1,681	--	3,022	5,959	--	--	--	6,436	--	--	7,818
Oak-hickory	96,094	--	--	2,078	5,523	17,199	--	9,538	--	11,944	19,723	18,046	12,043	--
Elm-ash-soft maple	501,316	11,272	13,838	6,317	16,223	15,511	30,007	26,088	37,089	59,043	41,791	80,346	84,417	79,374
Maple-birch	10,225,051	74,966	95,623	79,044	257,949	941,264	1,071,215	540,387	703,863	1,050,921	1,264,219	2,257,488	1,176,032	712,080
Aspen	1,457,782	51,778	43,940	19,052	136,754	258,152	354,509	161,162	256,035	103,714	19,953	52,733	--	--
Paper birch	266,102	3,257	4,813	1,184	18,796	23,086	53,901	40,546	39,183	28,370	25,775	--	20,603	6,588
Exotic	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All types	15,246,212	184,372	204,065	176,110	549,116	1,534,182	1,831,090	1,163,064	1,268,399	1,513,703	1,570,250	2,852,056	1,457,090	942,715

[1/] International 1/4-inch rule.

Table 38.--Net volume of growing stock on commercial forest land by forest type, stand-size class, and basal-area class, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)						
		0-10	11-20	21-30	31-40	41-50	51-60	61-70
Jack pine								
Sawtimber	42,271	--	--	--	--	2,860	10,387	4,284
Poletimber	54,250	--	853	--	--	428	4,717	6,327
Sapling & seedling	1,978	--	--	184	928	621	245	--
All stands	98,499	--	853	184	928	3,909	15,349	10,611
Red pine								
Sawtimber	43,718	--	--	--	--	--	--	--
Poletimber	26,283	--	--	--	--	1,492	1,928	--
Sapling & seedling	1,491	--	--	739	--	--	752	--
All stands	71,492	--	--	739	--	1,492	2,680	--
White pine								
Sawtimber	87,835	--	--	--	844	--	--	1,504
Poletimber	6,589	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--
All stands	94,424	--	--	--	844	--	--	1,504
Balsam fir								
Sawtimber	120,928	--	--	--	--	--	3,579	1,569
Poletimber	233,872	--	--	549	570	797	1,695	20,586
Sapling & seedling	34,703	77	1,563	269	4,686	2,414	3,082	7,330
All stands	389,503	77	1,563	818	5,256	3,211	8,356	29,485
White spruce								
Sawtimber	18,988	--	--	--	--	1,369	--	1,993
Poletimber	30,951	--	--	--	--	782	--	--
Sapling & seedling	2,742	--	--	502	--	1,236	1,004	--
All stands	52,681	--	--	502	--	3,387	1,004	1,993
Black spruce								
Sawtimber	11,358	--	--	--	--	--	--	--
Poletimber	108,476	--	--	--	1,450	1,744	6,186	2,561
Sapling & seedling	33,791	80	276	410	3,026	6,916	2,914	7,988
All stands	153,625	80	276	410	4,476	8,660	9,100	10,549
Northern white-cedar								
Sawtimber	132,786	--	--	--	--	964	898	2,108
Poletimber	115,131	--	--	--	--	--	--	969
Sapling & seedling	9,413	--	--	272	255	1,302	--	504
All stands	257,330	--	--	272	255	2,266	898	3,581

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine							
Sawtimber	5,895	3,949	9,981	4,915	--	--	--
Poletimber	1,303	2,972	4,025	--	31,381	--	2,244
Sapling & seedling	--	--	--	--	--	--	--
All stands	7,198	6,921	14,006	4,915	31,381	--	2,244
Red pine							
Sawtimber	2,938	1,945	2,179	--	25,077	11,579	--
Poletimber	--	1,075	1,969	--	9,032	10,787	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	2,938	3,020	4,148	--	34,109	22,366	--
White pine							
Sawtimber	7,267	--	11,388	9,485	14,272	43,075	--
Poletimber	3,245	1,572	1,772	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	10,512	1,572	13,160	9,485	14,272	43,075	--
Balsam fir							
Sawtimber	--	12,366	13,714	15,630	64,905	--	9,165
Poletimber	13,769	7,905	16,755	61,358	46,491	52,214	11,183
Sapling & seedling	1,545	2,335	5,361	2,864	2,250	927	--
All stands	15,314	22,606	35,830	79,852	113,646	53,141	20,348
White spruce							
Sawtimber	1,806	1,939	--	5,275	6,606	--	--
Poletimber	3,448	1,355	2,397	--	18,404	4,565	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	5,254	3,294	2,397	5,275	25,010	4,565	--
Black spruce							
Sawtimber	2,528	--	--	--	8,830	--	--
Poletimber	1,287	5,330	11,049	23,216	31,376	8,319	15,958
Sapling & seedling	3,709	1,139	4,189	2,236	908	--	--
All stands	7,524	6,469	15,238	25,452	41,114	8,319	15,958
Northern white-cedar							
Sawtimber	1,889	--	6,379	30,851	21,456	27,212	41,029
Poletimber	2,408	2,211	9,283	11,114	23,991	28,106	37,049
Sapling & seedling	--	2,449	--	1,593	2,685	353	--
All stands	4,297	4,660	15,662	43,558	48,132	55,671	78,078

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70
Tamarack								
Sawtimber	4,231	--	--	301	--	1,974	--	--
Poletimber	5,790	--	--	--	901	--	1,289	1,601
Sapling & seedling	6,593	94	968	624	2,059	--	--	397
All stands	16,614	94	968	925	2,960	1,974	1,289	1,998
Oak-hickory								
Sawtimber	17,222	--	--	--	--	--	--	--
Poletimber	15,101	--	--	--	--	--	--	--
Sapling & seedling	1,117	--	--	--	--	--	--	--
All stands	33,440	--	--	--	--	--	--	--
Elm-ash-soft maple								
Sawtimber	101,769	--	--	--	540	--	897	--
Poletimber	73,799	--	--	385	1,476	656	--	2,184
Sapling & seedling	17,431	--	748	--	908	1,781	1,293	4,604
All stands	192,999	--	748	385	2,924	2,437	2,190	6,788
Maple-birch								
Sawtimber	1,922,331	--	--	--	723	5,545	8,012	27,905
Poletimber	1,443,933	--	--	--	--	7,943	7,321	45,741
Sapling & seedling	102,576	150	932	1,402	3,279	11,215	14,330	14,608
All stands	3,468,840	150	932	1,402	4,002	24,703	29,663	88,254
Aspen								
Sawtimber	156,204	--	597	--	1,734	3,907	4,903	10,750
Poletimber	532,624	--	--	1,060	4,371	7,267	13,636	41,561
Sapling & seedling	69,875	440	4,409	6,437	10,762	14,002	6,363	10,119
All stands	758,703	440	5,006	7,497	16,867	25,176	24,902	62,430
Paper birch								
Sawtimber	33,056	--	--	--	765	--	--	--
Poletimber	153,609	--	--	--	--	960	2,842	1,417
Sapling & seedling	9,718	--	66	705	401	1,490	--	1,099
All stands	196,383	--	66	705	1,166	2,450	2,842	2,516
Exotic								
Sawtimber	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--
All stands	--	--	--	--	--	--	--	--
Nonstocked	498	225	273	--	--	--	--	--
All types								
Sawtimber	2,692,697	--	597	301	4,606	16,619	28,676	50,113
Poletimber	2,800,408	--	853	1,994	8,768	22,069	39,614	122,947
Sapling & seedling	291,428	841	8,962	11,544	26,304	40,977	29,983	46,649
Nonstocked	498	225	273	--	--	--	--	--
All stands	5,785,031	1,066	10,685	13,839	39,678	79,665	98,273	219,709

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack							
Sawtimber	--	--	--	--	1,956	--	--
Poletimber	1,999	--	--	--	--	--	--
Sapling & seedling	948	1,503	--	--	--	--	--
All stands	2,947	1,503	--	--	1,956	--	--
Oak-hickory							
Sawtimber	--	4,103	3,039	2,898	--	7,182	--
Poletimber	--	--	--	9,851	5,250	--	--
Sapling & seedling	--	--	--	1,117	--	--	--
All stands	--	4,103	3,039	13,866	5,250	7,182	--
Elm-ash-soft maple							
Sawtimber	--	2,943	3,109	14,056	40,543	35,909	3,772
Poletimber	3,217	4,017	10,999	9,452	17,774	20,084	3,555
Sapling & seedling	3,590	--	3,892	615	--	--	--
All stands	6,807	6,960	18,000	24,123	58,317	55,993	7,327
Maple-birch							
Sawtimber	67,137	65,035	180,502	406,108	757,550	306,048	97,766
Poletimber	65,928	72,851	136,588	345,957	567,564	175,677	18,363
Sapling & seedling	15,030	14,202	8,544	15,200	3,684	--	--
All stands	148,095	152,088	325,634	767,265	1,328,798	481,725	116,129
Aspen							
Sawtimber	15,342	17,824	9,433	22,837	39,653	29,224	--
Poletimber	38,315	40,252	55,530	95,240	147,275	50,568	37,549
Sapling & seedling	6,535	688	3,428	6,692	--	--	--
All stands	60,192	58,764	68,391	124,769	186,928	79,792	37,549
Paper birch							
Sawtimber	--	1,886	1,350	11,404	12,500	--	5,151
Poletimber	8,919	7,234	11,941	20,275	80,969	19,052	--
Sapling & seedling	1,305	2,528	--	2,124	--	--	--
All stands	10,224	11,648	13,291	33,803	93,469	19,052	5,151
Exotic							
Sawtimber	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	--	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--
All types							
Sawtimber	104,802	111,990	241,074	523,459	993,348	460,229	156,883
Poletimber	143,838	146,774	262,308	576,463	979,507	369,372	125,901
Sapling & seedling	32,662	24,844	25,414	32,441	9,527	1,280	--
Nonstocked	--	--	--	--	--	--	--
All stands	281,302	283,608	528,796	1,132,363	1,982,382	830,881	282,784

Table 39.--Net volume of sawtimber on commercial forest land by forest type, stand-size class, and basal-area class, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)						
		0-10	11-20	21-30	31-40	41-50	51-60	61-70
Jack pine								
Sawtimber	161,918	--	--	--	--	12,649	48,056	16,042
Poletimber	92,096	--	2,399	--	--	--	9,698	26,047
Sapling & seedling	6,226	--	--	--	2,383	2,971	872	--
All stands	260,240	--	2,399	--	2,383	15,620	58,626	42,089
Red pine								
Sawtimber	168,660	--	--	--	--	--	--	--
Poletimber	33,308	--	--	--	--	2,716	5,116	--
Sapling & seedling	3,616	--	--	--	--	--	3,616	--
All stands	205,584	--	--	--	--	2,716	8,732	--
White pine								
Sawtimber	332,197	--	--	--	3,033	--	--	6,378
Poletimber	13,994	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--
All stands	346,191	--	--	--	3,033	--	--	6,378
Balsam fir								
Sawtimber	375,925	--	--	--	--	--	11,999	6,462
Poletimber	445,180	--	--	584	666	1,889	4,366	40,642
Sapling & seedling	52,948	360	2,175	834	9,804	4,450	2,703	6,783
All stands	874,053	360	2,175	1,418	10,470	6,339	19,068	53,887
White spruce								
Sawtimber	64,529	--	--	--	--	6,391	--	8,225
Poletimber	32,486	--	--	--	--	1,977	--	--
Sapling & seedling	9,279	--	--	2,243	--	5,783	1,253	--
All stands	106,294	--	--	2,243	--	14,151	1,253	8,225
Black spruce								
Sawtimber	35,095	--	--	--	--	--	--	--
Poletimber	183,627	--	--	--	2,657	2,057	7,926	5,211
Sapling & seedling	32,234	--	--	--	3,745	10,520	4,376	2,153
All stands	250,956	--	--	--	6,402	12,577	12,302	7,364
Northern white-cedar								
Sawtimber	447,955	--	--	--	--	2,729	4,341	8,747
Poletimber	159,874	--	--	--	--	--	--	690
Sapling & seedling	12,135	--	--	913	--	--	--	334
All stands	619,964	--	--	913	--	2,729	4,341	9,771

(Table 39 continued on next page)

(Table 39 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine							
Sawtimber	20,565	14,400	36,336	13,870	--	--	--
Poletimber	1,617	5,416	9,418	--	36,547	--	954
Sapling & seedling	--	--	--	--	--	--	--
All stands	22,182	19,816	45,754	13,870	36,547	--	954
Red pine							
Sawtimber	10,283	5,912	7,358	--	102,577	42,530	--
Poletimber	--	2,684	2,676	--	7,397	12,719	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	10,283	8,596	10,034	--	109,974	55,249	--
White pine							
Sawtimber	33,882	--	48,366	32,188	51,920	156,430	--
Poletimber	6,641	2,899	4,454	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	40,523	2,899	52,820	32,188	51,920	156,430	--
Balsam fir							
Sawtimber	--	39,310	46,533	46,403	196,074	--	29,144
Poletimber	32,726	8,537	33,370	121,230	77,125	109,013	15,032
Sapling & seedling	2,190	4,570	10,448	2,919	5,712	--	--
All stands	34,916	52,417	90,351	170,552	278,911	109,013	44,176
White spruce							
Sawtimber	5,909	5,942	--	18,077	19,985	--	--
Poletimber	3,243	1,642	6,203	--	10,188	9,233	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	9,152	7,584	6,203	18,077	30,173	9,233	--
Black spruce							
Sawtimber	6,931	--	--	--	28,164	--	--
Poletimber	983	5,358	21,261	41,602	43,354	19,806	33,412
Sapling & seedling	3,733	2,269	5,438	--	--	--	--
All stands	11,647	7,627	26,699	41,602	71,518	19,806	33,412
Northern white-cedar							
Sawtimber	6,294	--	20,402	108,220	73,167	98,269	125,786
Poletimber	3,777	4,535	10,813	11,355	32,557	41,324	54,823
Sapling & seedling	--	5,136	--	2,681	2,638	433	--
All stands	10,071	9,671	31,215	122,256	108,362	140,026	180,609

(Table 39 continued on next page)

(Table 39 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70
Tamarack								
Sawtimber	14,597	--	--	748	--	7,818	--	--
Poletimber	8,638	--	--	--	669	--	2,758	1,891
Sapling & seedling	13,350	--	4,174	811	4,846	--	--	--
All stands	36,585	--	4,174	1,559	5,515	7,818	2,758	1,891
Oak-hickory								
Sawtimber	61,756	--	--	--	--	--	--	--
Poletimber	32,260	--	--	--	--	--	--	--
Sapling & seedling	2,078	--	--	--	--	--	--	--
All stands	96,094	--	--	--	--	--	--	--
Elm-ash-soft maple								
Sawtimber	345,648	--	--	--	2,378	--	3,706	--
Poletimber	125,353	--	--	--	1,112	734	--	3,391
Sapling & seedling	30,315	--	954	--	4,047	3,327	485	4,872
All stands	501,316	--	954	--	7,537	4,061	4,191	8,263
Maple-birch								
Sawtimber	7,423,179	--	--	--	2,950	24,761	30,998	108,645
Poletimber	2,583,050	--	--	--	--	13,768	5,646	81,935
Sapling & seedling	218,822	751	507	4,189	5,086	16,304	29,890	32,061
All stands	10,225,051	751	507	4,189	8,036	54,833	66,534	222,641
Aspen								
Sawtimber	490,671	--	2,224	--	6,128	12,316	16,856	35,772
Poletimber	865,754	--	--	2,546	3,668	5,384	18,423	66,118
Sapling & seedling	101,357	--	3,470	11,876	13,403	21,868	12,592	14,780
All stands	1,457,782	--	5,694	14,422	23,199	39,568	47,871	116,670
Paper birch								
Sawtimber	91,486	--	--	--	2,932	--	--	--
Poletimber	165,362	--	--	--	--	617	694	2,804
Sapling & seedling	9,254	--	--	1,298	1,458	--	--	2,018
All stands	266,102	--	--	1,298	4,390	617	694	4,822
Exotic								
Sawtimber	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--
All stands	--	--	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--	--
All types								
Sawtimber	10,013,616	0	2,224	748	17,421	66,664	115,956	190,271
Poletimber	4,740,982	0	2,399	3,130	8,772	29,142	54,627	228,729
Sapling & seedling	491,614	1,111	11,280	22,164	44,772	65,223	55,787	63,001
Nonstocked	--	--	--	--	--	--	--	--
All stands	15,246,212	1,111	15,903	26,042	70,965	161,029	226,370	482,001

(Table 39 continued on next page)

(Table 39 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)						
	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack							
Sawtimber	--	--	--	--	6,031	--	--
Poletimber	3,320	--	--	--	--	--	--
Sapling & seedling	462	3,057	--	--	--	--	--
All stands	3,782	3,057	--	--	6,031	--	--
Oak-hickory							
Sawtimber	--	18,483	10,365	11,944	--	20,964	--
Poletimber	--	--	--	22,763	9,497	--	--
Sapling & seedling	--	--	--	2,078	--	--	--
All stands	--	18,483	10,365	36,785	9,497	20,964	--
Elm-ash-soft maple							
Sawtimber	--	8,929	12,015	54,876	133,717	116,343	13,684
Poletimber	4,550	4,600	21,214	15,806	28,758	39,513	5,675
Sapling & seedling	8,446	--	7,637	547	--	--	--
All stands	12,996	13,529	40,866	71,229	162,475	155,856	19,359
Maple-birch							
Sawtimber	272,388	257,445	671,328	1,539,870	2,942,127	1,163,691	408,976
Poletimber	124,258	112,311	209,752	641,735	1,040,333	316,045	37,267
Sapling & seedling	27,064	25,417	28,131	43,347	6,075	--	--
All stands	423,710	395,173	909,211	2,224,952	3,988,535	1,479,736	446,243
Aspen							
Sawtimber	49,712	58,807	28,768	76,353	122,984	80,751	--
Poletimber	49,032	51,543	76,085	177,096	250,404	76,443	89,012
Sapling & seedling	10,863	1,419	3,192	7,894	--	--	--
All stands	109,607	111,769	108,045	261,343	373,388	157,194	89,012
Paper birch							
Sawtimber	--	6,127	4,269	30,411	29,891	--	17,856
Poletimber	9,417	5,417	10,089	30,692	84,314	21,318	--
Sapling & seedling	1,959	1,059	--	1,462	--	--	--
All stands	11,376	12,603	14,358	62,565	114,205	21,318	17,856
Exotic							
Sawtimber	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	--	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--
All types							
Sawtimber	405,964	415,355	885,740	1,932,212	3,706,637	1,678,978	595,446
Poletimber	239,564	204,942	405,335	1,062,279	1,620,474	645,414	236,175
Sapling & seedling	54,717	42,927	54,846	60,928	14,425	433	--
Nonstocked	--	--	--	--	--	--	--
All stands	700,245	663,224	1,345,921	3,055,419	5,341,536	2,324,825	831,621

1/ International 1/4-inch rule.

Table 40.--Net volume of sawtimber on commercial forest land by species group and log-grade class, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All grades	Log grade 1	2	3	Tie and timber
SOFTWOODS					
White pine	780,033	51,328	97,679	433,711	197,315
Red pine	279,874	3,870	11,768	252,919	11,317
Jack pine	276,692	699	3,108	270,069	2,816
White spruce	745,345	--	36,109	709,236	--
Black spruce	153,343	760	2,695	149,888	--
Balsam fir	610,899	3,018	915	588,913	18,053
Hemlock	1,444,202	25,287	109,919	1,308,996	--
Tamarack	61,261	--	--	61,261	--
Northern white-cedar	994,377	12,008	32,174	950,195	--
Other softwoods	589	--	--	589	--
Total	5,346,615	96,970	294,367	4,725,777	229,501
HARDWOODS					
Select white oaks	3,693	--	52	1,393	2,248
Select red oaks	298,531	26,495	97,415	149,824	24,797
Other red oaks	--	--	--	--	--
Hickory	--	--	--	--	--
Yellow birch	1,049,376	131,272	302,789	570,125	45,190
Hard maple	4,009,884	596,280	1,086,771	2,088,591	238,242
Soft maple	1,168,710	105,476	246,897	795,652	20,685
Beech	821	124	199	469	29
Ash	278,324	36,472	66,713	167,793	7,346
Balsam poplar	153,205	8,765	36,947	96,557	10,936
Cottonwood	371	--	--	345	26
Bigtooth aspen	242,428	16,506	54,127	149,147	22,648
Quaking aspen	1,360,348	43,268	156,647	1,016,770	143,663
Basswood	505,144	56,160	163,362	270,429	15,193
Yellow-poplar	--	--	--	--	--
Black walnut	--	--	--	--	--
Black cherry	55,406	3,526	730	43,482	7,668
Butternut	--	--	--	--	--
Elm	396,325	46,406	145,515	176,655	27,749
Paper birch	376,599	3,134	41,844	300,570	31,051
Other hardwoods	432	--	173	259	--
Total	9,899,597	1,073,884	2,400,181	5,828,061	597,471
All species	15,246,212	1,170,854	2,694,548	10,553,838	826,972

[1/]International 1/4-inch rule.

Table 41.--Net volume of short-log trees on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39-0+
SOFTWOODS											
White pine	1,014	258	121	81	--	163	75	--	316	--	--
Red pine	143	--	143	--	--	--	--	--	--	--	--
Jack pine	833	303	264	78	--	188	--	--	--	--	--
White spruce	992	527	148	251	--	66	--	--	--	--	--
Black spruce	--	--	--	--	--	--	--	--	--	--	--
Balsam fir	1,289	608	396	69	--	216	--	--	--	--	--
Hemlock	8,360	2,623	1,774	1,161	680	948	361	491	201	121	--
Tamarack	60	--	--	--	60	--	--	--	--	--	--
Northern white-cedar	13,411	2,902	3,528	1,524	2,043	850	694	760	1,013	97	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	26,102	7,221	6,374	3,164	2,783	2,431	1,130	1,251	1,530	218	--
HARDWOODS											
Select white oaks	--	--	--	--	--	--	--	--	--	--	--
Select red oaks	2,266	--	236	377	386	112	628	209	318	--	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	21,050	--	2,938	2,612	3,516	1,789	2,709	1,561	3,384	2,541	--
Hard maple	31,141	--	7,516	5,510	4,697	3,896	2,628	1,529	3,428	1,937	--
Soft maple	13,593	--	4,753	3,057	1,853	1,276	772	508	1,321	53	--
Beech	202	--	95	--	107	--	--	--	--	--	--
Ash	1,062	--	626	184	252	--	--	--	--	--	--
Balsam poplar	392	--	304	--	88	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--
Bigtooth aspen	2,568	--	1,015	865	169	263	164	92	--	--	--
Quaking aspen	12,396	--	4,881	2,912	2,623	1,100	703	177	--	--	--
Basswood	3,042	--	1,086	361	544	171	253	381	114	132	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	1,706	--	1,053	282	--	371	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	3,832	--	1,923	880	106	492	230	--	201	--	--
Paper birch	3,969	--	2,067	444	426	340	332	281	--	79	--
Other hardwoods	57	--	--	57	--	--	--	--	--	--	--
Total	97,276	--	28,493	17,541	14,767	9,810	8,419	4,738	8,766	4,742	--
All species	123,378	7,221	34,867	20,705	17,550	12,241	9,550	5,988	10,296	4,960	--

Table 42.--Net volume of short-log trees on commercial forest land by species group and diameter class, Western Upper Peninsula, Michigan, 1980

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 22.9	23.0- 28.9	29.0- 38.9	39-0+
SOFTWOODS											
White pine	3,350	1,093	453	275	--	502	211	--	816	--	--
Red pine	539	--	539	--	--	--	--	--	--	--	--
Jack pine	2,938	1,241	978	301	--	418	--	--	--	--	--
White spruce	3,904	2,332	556	821	--	195	--	--	--	--	--
Black spruce	--	--	--	--	--	--	--	--	--	--	--
Balsam fir	4,155	2,481	1,164	246	--	264	--	--	--	--	--
Hemlock	30,012	10,457	6,745	4,024	2,186	2,970	1,423	1,421	527	259	--
Tamarack	186	--	--	--	186	--	--	--	--	--	--
Northern white-cedar	36,766	11,179	10,616	3,887	4,722	1,737	1,660	1,354	1,531	80	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	81,850	28,783	21,051	9,554	7,094	6,086	3,294	2,775	2,874	339	--
HARDWOODS											
Select white oaks	--	--	--	--	--	--	--	--	--	--	--
Select red oaks	6,024	--	588	1,000	638	330	1,877	633	958	--	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	82,879	--	15,866	12,895	14,964	7,094	10,069	6,504	8,906	6,581	--
Hard maple	83,883	--	21,317	15,853	12,889	10,946	6,203	3,380	9,230	4,065	--
Soft maple	41,121	--	14,664	8,348	5,461	3,994	2,738	1,575	4,176	165	--
Beech	507	--	242	--	265	--	--	--	--	--	--
Ash	2,686	--	1,807	491	388	--	--	--	--	--	--
Balsam poplar	998	--	745	--	253	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--
Bigtooth aspen	6,036	--	2,502	2,047	402	583	322	180	--	--	--
Quaking aspen	33,808	--	14,035	7,585	6,807	2,833	2,198	350	--	--	--
Basswood	9,112	--	2,729	918	1,493	413	1,033	1,802	343	381	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	4,970	--	3,162	755	--	1,053	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	11,425	--	5,942	2,404	300	1,495	679	--	605	--	--
Paper birch	11,303	--	5,085	1,311	1,278	1,309	1,128	893	--	299	--
Other hardwoods	220	--	--	220	--	--	--	--	--	--	--
Total	294,972	--	88,684	53,827	45,138	30,050	26,247	15,317	24,218	11,491	--
All species	376,822	28,783	109,735	63,381	52,232	36,136	29,541	18,092	27,092	11,830	--

[1/]International 1/4-inch rule.

Table 43.--Net annual growth of growing stock on commercial forest land by softwoods and hardwoods, Western Upper Pennisula, Michigan, 1965 and 1979

(In million cubic feet)

Species	1965	1979
Softwoods	40.0	60.9
Hardwoods	98.9	133.8
All species	138.9	194.7

1/Figures have been adjusted from those published after the 1965 survey to conform to 1979 volumes because of changes in survey definitions and procedures.

Table 44.--Net annual growth of growing stock on commercial forest land by species group and county, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
SOFTWOODS									
White pine	4,794	347	283	196	356	791	374	1,879	568
Red pine	3,030	113	190	420	508	364	24	902	509
Jack pine	3,999	208	118	263	731	301	--	1,986	392
White spruce	12,811	1,198	966	1,528	941	2,195	634	2,646	2,703
Black spruce	4,936	776	622	516	121	1,064	16	1,719	102
Balsam fir	16,748	1,824	1,395	2,284	1,012	3,217	403	4,209	2,404
Hemlock	6,260	1,209	41	1,228	699	457	5	1,444	1,177
Tamarack	841	153	149	95	9	259	3	170	3
Northern white-cedar	7,331	843	1,218	752	518	604	813	2,198	385
Other softwoods	86	--	--	4	1	2	--	76	3
Total	60,836	6,671	4,982	7,286	4,896	9,254	2,272	17,229	8,246
HARDWOODS									
Select white oaks	17	1	--	4	2	2	--	--	8
Select red oaks	2,599	100	117	264	254	179	373	1,124	188
Other red oaks	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--
Yellow birch	6,723	890	127	1,482	1,241	626	361	821	1,175
Hard maple	49,016	6,913	3,178	7,296	7,277	7,190	1,833	8,295	7,034
Soft maple	31,444	4,373	798	3,095	5,424	2,741	1,475	8,992	4,546
Beech	11	--	--	--	--	--	--	11	--
Ash	7,914	444	782	2,122	638	770	53	961	2,144
Balsam poplar	917	27	441	4	8	151	7	224	55
Cottonwood	6	--	--	--	--	6	--	--	--
Bigtooth aspen	2,295	101	162	196	205	360	8	640	623
Quaking aspen	15,664	841	2,478	1,875	1,500	2,896	316	2,068	3,690
Basswood	7,530	287	1,164	1,306	922	1,087	32	473	2,259
Yellow-poplar	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Black cherry	2,109	345	179	337	148	431	9	427	233
Butternut	--	--	--	--	--	--	--	--	--
Elm	-1,291	-38	166	-334	-242	-338	-22	-12	-471
Paper birch	8,873	507	1,221	610	571	1,933	576	2,565	890
Other hardwoods	8	--	--	3	--	--	--	--	5
Total	133,835	14,791	10,813	18,260	17,948	18,034	5,021	26,589	22,379
All species	194,671	21,462	15,795	25,546	22,844	27,288	7,293	43,818	30,625

Table 45.--Net annual growth of sawtimber on commercial forest land by species group and county, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
SOFTWOODS									
White pine	25,759	1,901	1,350	1,032	2,327	4,779	2,019	9,029	3,322
Red pine	12,329	449	483	1,266	2,101	1,292	621	4,173	1,944
Jack pine	21,954	1,226	88	1,051	3,406	1,144	--	12,910	2,129
White spruce	53,710	6,795	4,135	7,857	6,012	8,674	3,263	8,249	8,725
Black spruce	5,499	277	853	349	-192	1,612	45	2,629	-74
Balsam fir	44,394	3,728	5,163	6,552	4,522	7,704	830	9,227	6,668
Hemlock	37,543	7,070	192	6,735	3,910	2,518	35	10,177	6,906
Tamarack	3,722	1,043	69	807	151	826	31	571	224
Northern white-cedar	32,141	3,472	4,053	4,953	2,680	4,620	3,255	6,656	2,452
Other softwoods	8	--	--	8	--	--	--	--	--
Total	237,059	25,961	16,386	30,610	24,917	33,169	10,099	63,621	32,296
HARDWOODS									
Select white oaks	104	7	--	23	12	10	--	--	52
Select red oaks	15,496	273	1,116	1,600	2,016	503	2,154	7,455	379
Other red oaks	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--
Yellow birch	19,639	4,590	140	1,471	5,882	1,988	1,521	2,414	1,633
Hard maple	139,326	24,066	5,119	15,433	22,959	20,437	6,324	27,446	17,542
Soft maple	79,450	15,687	2,581	7,973	14,100	9,248	4,255	17,277	8,329
Beech	8	--	--	--	--	--	--	8	--
Ash	31,615	2,267	2,235	11,297	2,879	1,998	578	3,289	7,072
Balsam poplar	4,484	59	2,715	19	19	198	--	1,269	205
Cottonwood	27	--	--	--	--	27	--	--	--
Bigtooth aspen	17,011	398	1,598	1,738	2,592	1,567	-7	4,390	4,735
Quaking aspen	93,060	3,927	6,374	14,885	10,716	14,609	2,217	14,313	26,019
Basswood	29,144	597	5,860	5,127	2,289	4,519	146	2,565	8,041
Yellow-poplar	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Black cherry	4,548	1,931	30	750	68	99	--	1,622	48
Butternut	--	--	--	--	--	--	--	--	--
Elm	1,630	-119	860	1,405	853	-105	-139	-198	-927
Paper birch	28,787	3,818	2,248	1,904	4,888	6,483	2,269	5,876	1,301
Other hardwoods	16	--	--	--	--	--	--	--	16
Total	464,345	57,501	30,876	63,625	69,273	61,581	19,318	87,726	74,445
All species	701,404	83,462	47,262	94,235	94,190	94,750	29,417	151,347	106,741

[1/] International 1/4-inch rule.

Table 46.--Net annual growth of growing stock on commercial forest land by species group and ownership class, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	4,794	1,010	--	--	--	816	23	1,020	163	919	843
Red pine	3,030	1,630	--	--	--	438	--	209	35	191	527
Jack pine	3,999	1,560	--	--	--	946	370	363	--	229	531
White spruce	12,811	2,363	--	6	99	1,957	140	4,146	477	1,754	1,869
Black spruce	4,936	645	--	1	--	967	115	1,450	131	350	1,277
Balsam fir	16,748	3,452	--	36	2	2,327	139	4,860	846	1,610	3,476
Hemlock	6,260	902	--	--	47	373	62	2,586	220	813	1,257
Tamarack	841	5	--	--	--	466	8	148	28	111	75
Northern white-cedar	7,331	700	--	--	2	1,830	106	2,313	298	991	1,091
Other softwoods	86	8	--	--	--	--	--	--	--	2	76
Total	60,836	12,275	--	43	150	10,120	963	17,095	2,198	6,970	11,022
HARDWOODS											
Select white oak	17	17	--	--	--	--	--	--	--	--	--
Select red oaks	2,599	135	--	--	5	434	--	671	94	585	675
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	6,723	977	--	2	43	507	35	2,062	262	1,746	1,089
Hard maple	49,016	7,147	--	--	156	4,185	1,389	16,691	2,483	8,127	8,838
Soft maple	31,444	5,436	--	--	207	3,443	320	7,874	1,858	5,005	7,301
Beech	11	--	--	--	--	5	--	6	--	--	--
Ash	7,914	1,764	--	--	12	778	407	2,391	400	1,119	1,043
Balsam poplar	917	18	--	--	--	315	--	267	42	50	225
Cottonwood	6	--	--	--	--	--	--	--	6	--	--
Bigtooth aspen	2,295	743	--	--	48	342	30	121	44	489	478
Quaking aspen	15,664	2,783	--	--	78	2,775	389	2,716	1,081	2,349	3,493
Basswood	7,530	1,570	--	--	2	721	162	1,703	529	1,314	1,529
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	2,109	331	--	--	--	242	66	691	113	291	375
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	-1,291	-519	--	--	-6	-75	-30	-322	-190	-42	-107
Paper birch	8,873	1,144	--	5	--	1,531	69	1,948	477	1,200	2,499
Other hardwoods	8	--	--	--	--	--	--	--	--	5	3
Total	133,835	21,546	--	7	545	15,203	2,837	36,819	7,199	22,238	27,441
All species	194,671	33,821	--	50	695	25,323	3,800	53,914	9,397	29,208	38,463

Table 47.--Net annual growth of sawtimber on commercial forest land by species group and ownership class, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All owners	Ownership class									
		National Forest	Bureau of Land Mgmt.	Misc. federal	Indian	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
SOFTWOODS											
White pine	25,759	5,443	--	--	--	4,779	88	4,843	754	5,141	4,711
Red pine	12,329	5,967	--	--	--	2,655	--	719	72	1,511	1,405
Jack pine	21,954	7,661	--	--	--	8,409	582	993	--	2,224	2,085
White spruce	53,710	13,900	--	546	52	9,357	680	11,201	1,885	9,574	6,515
Black spruce	5,499	-160	--	--	--	1,962	470	2,770	559	-134	32
Balsam fir	44,394	8,114	--	127	--	7,606	916	11,311	1,330	4,451	10,539
Hemlock	37,543	4,813	--	--	240	2,005	236	18,531	1,150	4,923	5,645
Tamarack	3,722	1,443	--	--	--	1,069	34	903	7	149	117
Northern white-cedar	32,141	6,161	--	--	11	4,793	357	10,270	613	5,082	4,854
Other softwoods	8	--	--	--	--	--	--	--	--	8	--
Total	237,059	53,342	--	673	303	42,635	3,363	61,541	6,370	32,929	35,903
HARDWOODS											
Select white oaks	104	104	--	--	--	--	--	--	--	--	--
Select red oaks	15,496	575	--	--	30	1,656	--	5,188	976	2,782	4,289
Other red oaks	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	19,639	805	--	13	579	744	-128	8,788	2,003	4,367	2,468
Hard maple	139,326	17,920	--	--	180	9,410	2,270	55,991	7,215	22,291	24,049
Soft maple	79,450	15,132	--	--	215	7,478	956	22,039	5,970	9,773	17,887
Beech	8	--	--	--	--	8	--	--	--	--	--
Ash	31,615	7,854	--	--	48	3,989	2,329	7,504	243	5,707	3,941
Balsam poplar	4,484	88	--	--	--	2,427	--	1,296	87	81	505
Cottonwood	27	--	--	--	--	--	--	--	27	--	--
Bigtooth aspen	17,011	7,736	--	--	58	623	65	998	793	2,208	4,530
Quaking aspen	93,060	27,690	--	--	115	12,623	4,507	16,283	3,517	11,755	16,570
Basswood	29,144	6,858	--	--	16	5,566	753	6,043	2,144	3,551	4,213
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--
Black cherry	4,548	118	--	--	--	66	9	2,678	816	73	788
Butternut	--	--	--	--	--	--	--	--	--	--	--
Elm	1,630	-2,077	--	--	-19	1,836	-250	3,791	-214	-662	-775
Paper birch	28,787	8,104	--	12	--	4,351	49	5,996	1,449	4,572	4,254
Other hardwoods	16	--	--	--	--	--	--	--	--	16	--
Total	464,345	90,907	--	25	1,222	50,777	10,560	136,595	25,026	66,514	82,719
All species	701,404	144,249	--	698	1,525	93,412	13,923	198,136	31,396	99,443	118,622

[1/] International 1/4-inch rule.

Table 48.--Net annual growth of growing stock on commercial forest land by species group and forest type, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	4,794	54	233	1,490	533	117	121	88
Red pine	3,030	463	1,695	96	65	2	142	1
Jack pine	3,999	3,031	71	7	24	71	255	--
White spruce	12,811	12	44	226	2,968	2,006	118	256
Black spruce	4,936	4	11	27	665	28	3,449	38
Balsam fir	16,748	33	11	-6	6,039	133	449	-465
Hemlock	6,260	--	--	9	115	--	14	9
Tamarack	841	--	--	-1	80	-1	390	-177
Northern white-cedar	7,331	--	--	15	843	36	411	3,651
Other softwoods	86	--	8	--	--	--	76	--
Total	60,836	3,597	2,073	1,863	11,332	2,392	5,425	3,401
HARDWOODS								
Select white oaks	17	--	--	--	--	--	--	--
Select red oaks	2,599	47	34	89	23	--	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	6,723	--	--	2	121	4	12	131
Hard maple	49,016	--	49	136	147	39	10	139
Soft maple	31,444	8	40	280	1,039	127	219	208
Beech	11	--	--	--	--	--	--	--
Ash	7,914	--	--	--	226	--	69	214
Balsam poplar	917	--	2	--	105	1	5	44
Cottonwood	6	--	--	--	--	--	--	--
Bigtooth aspen	2,295	11	49	--	-30	--	6	-18
Quaking aspen	15,664	105	101	213	564	216	108	101
Basswood	7,530	--	--	14	7	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	2,109	--	--	--	100	6	8	4
Butternut	--	--	--	--	--	--	--	--
Elm	-1,291	--	--	-2	-36	3	--	54
Paper birch	8,873	6	59	101	839	36	321	118
Other hardwoods	8	--	--	--	--	--	--	--
Total	133,835	177	334	833	3,105	432	758	995
All species	194,671	3,774	2,407	2,696	14,437	2,824	6,183	4,396

(Table 48 continued on next page)

(Table 48 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	8	40	54	1,329	574	149	--	4
Red pine	--	29	--	23	463	51	--	--
Jack pine	--	--	--	144	298	90	--	8
White spruce	53	5	414	3,599	2,595	515	--	--
Black spruce	211	2	177	89	227	8	--	--
Balsam fir	38	3	396	5,903	3,537	677	--	--
Hemlock	--	--	279	5,718	97	19	--	--
Tamarack	501	--	5	--	40	4	--	--
Northern white-cedar	91	--	570	1,433	168	113	--	--
Other softwoods	--	--	--	2	--	--	--	--
Total	902	79	1,895	18,240	7,999	1,626	--	12
HARDWOODS								
Select white oaks	--	--	--	--	17	--	--	--
Select red oaks	--	673	20	1,228	385	100	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	--	5	250	5,955	133	110	--	--
Hard maple	--	91	646	44,687	2,504	568	--	--
Soft maple	--	104	1,634	22,122	3,877	1,786	--	--
Beech	--	--	--	11	--	--	--	--
Ash	--	6	2,775	3,987	589	48	--	--
Balsam poplar	3	--	27	105	603	22	--	--
Cottonwood	--	--	--	--	6	--	--	--
Bigtooth aspen	--	53	--	122	2,007	95	--	--
Quaking aspen	10	9	76	3,165	10,788	199	--	9
Basswood	--	--	68	7,181	247	13	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	--	18	1,607	343	23	--	--
Butternut	--	--	--	--	--	--	--	--
Elm	--	--	-161	-1,318	69	100	--	--
Paper birch	12	48	101	1,316	2,425	3,484	--	7
Other hardwoods	--	--	5	3	--	--	--	--
Total	25	989	5,459	90,171	23,993	6,548	--	16
All species	927	1,068	7,354	108,411	31,992	8,174	--	28

Table 49.--Net annual growth of sawtimber on commercial forest land by species group and forest type, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	25,759	253	1,537	7,664	3,130	524	625	547
Red pine	12,329	768	9,201	476	280	12	399	5
Jack pine	21,954	18,038	524	50	29	26	286	--
White spruce	53,710	62	53	634	15,341	3,382	396	341
Black spruce	5,499	3	--	916	2,510	543	880	19
Balsam fir	44,394	185	529	15	15,282	556	-524	-1,516
Hemlock	37,543	--	--	53	953	--	76	43
Tamarack	3,722	--	--	-9	714	-18	1,626	-202
Northern white-cedar	32,141	--	--	29	4,718	80	3,147	12,123
Other softwoods	8	--	--	--	--	--	--	--
Total	237,059	19,309	11,844	9,828	42,957	5,105	6,911	11,360
HARDWOODS								
Select white oaks	104	--	--	--	--	--	--	--
Select red oaks	15,496	44	148	15	--	--	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	19,639	--	--	--	1,416	--	34	199
Hard maple	139,326	--	--	71	245	33	25	114
Soft maple	79,450	--	9	134	6,891	--	31	311
Beech	8	--	--	--	--	--	--	--
Ash	31,615	--	--	--	139	--	1,101	105
Balsam poplar	4,484	--	9	--	129	--	19	-37
Cottonwood	27	--	--	--	--	--	--	--
Bigtooth aspen	17,011	23	666	--	-176	--	--	-100
Quaking aspen	93,060	--	56	121	5,952	754	763	-24
Basswood	29,144	--	--	--	10	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	4,548	--	--	--	18	--	--	4
Butternut	--	--	--	--	--	--	--	--
Elm	1,630	--	--	--	683	-6	--	-9
Paper birch	28,787	13	53	743	352	15	1,755	664
Other hardwoods	16	--	--	--	--	--	--	--
Total	464,345	80	941	1,084	15,659	796	3,728	1,227
All species	701,404	19,389	12,785	10,912	58,616	5,901	10,639	12,587

[1/]International 1/4-inch rule.

(Table 49 continued on next page)

(Table 49 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	52	205	279	6,701	3,469	773	--	--
Red pine	--	141	--	92	700	255	--	--
Jack pine	--	--	--	68	2,121	812	--	--
White spruce	--	28	1,637	18,492	11,806	1,538	--	--
Black spruce	33	--	441	-314	514	-46	--	--
Balsam fir	33	--	749	17,971	10,442	672	--	--
Hemlock	--	--	862	35,320	156	80	--	--
Tamarack	1,401	--	36	--	169	5	--	--
Northern white-cedar	961	--	1,951	7,065	1,088	979	--	--
Other softwoods	--	--	--	8	--	--	--	--
Total	2,480	374	5,955	85,403	30,465	5,068	--	--
HARDWOODS								
Select white oaks	--	--	--	--	104	--	--	--
Select red oaks	--	3,852	19	8,616	2,060	742	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	--	8	1,988	15,926	33	35	--	--
Hard maple	--	583	380	136,424	1,308	143	--	--
Soft maple	--	15	3,361	64,098	3,719	881	--	--
Beech	--	--	--	8	--	--	--	--
Ash	--	33	14,146	14,888	1,162	41	--	--
Balsam poplar	7	--	23	684	3,020	630	--	--
Cottonwood	--	--	--	--	27	--	--	--
Bigtooth aspen	--	58	--	1,652	14,816	72	--	--
Quaking aspen	11	13	-174	25,325	58,745	1,518	--	--
Basswood	--	--	657	28,396	81	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	--	12	4,453	61	--	--	--
Butternut	--	--	--	--	--	--	--	--
Elm	--	--	-510	915	579	-22	--	--
Paper birch	--	54	103	7,490	3,733	13,812	--	--
Other hardwoods	--	--	16	--	--	--	--	--
Total	18	4,616	20,021	308,875	89,448	17,852	--	--
All species	2,498	4,990	25,976	394,278	119,913	22,920	--	--

Table 50.--Net annual growth of growing stock on commercial forest land by forest type and stand-age class, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	3,774	--	79	598	789	921	1,077	184	45	88	-7	--	--	--
Red pine	2,407	--	170	520	712	--	71	264	65	165	54	335	51	--
White pine	2,696	--	--	177	75	135	--	616	134	779	257	192	227	104
Balsam fir	14,437	682	735	668	1,888	2,814	2,734	1,515	1,411	623	381	799	8	179
White spruce	2,824	118	43	--	1,456	164	393	129	87	--	--	434	--	--
Black spruce	6,183	611	612	936	510	783	1,416	610	480	--	33	81	98	13
Northern white-cedar	4,396	22	148	150	100	397	296	476	663	1,131	336	563	136	-22
Tamarack	927	76	69	180	4	229	222	15	--	--	107	--	--	25
Oak-hickory	1,068	--	--	53	173	225	--	220	--	70	121	146	60	--
Elm-ash-soft maple	7,354	167	776	205	634	693	879	686	528	630	230	553	650	723
Maple-birch	108,411	2,715	2,898	1,976	7,587	20,142	19,512	7,578	7,864	8,225	8,876	13,610	5,738	1,690
Aspen	31,992	2,508	1,735	1,123	5,086	7,633	7,673	2,337	2,361	1,033	232	271	--	--
Paper birch	8,174	109	264	99	672	1,038	3,111	1,473	620	387	128	--	234	39
Exotic	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	28	11	8	--	9	--	--	--	--	--	--	--	--	--
All types	194,671	7,019	7,537	6,685	19,695	35,174	37,384	16,103	14,258	13,131	10,748	16,984	7,202	2,751

Table 51.--Net annual growth of sawtimber on commercial forest land by forest type and stand-age class, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Forest type	All classes	Stand-age class (years)												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack pine	19,389	--	172	2,261	3,811	2,614	8,559	1,634	433	30	-125	--	--	--
Red pine	12,785	--	278	292	5,062	--	853	1,029	666	1,218	799	2,489	99	--
White pine	10,912	--	--	95	140	77	--	2,959	529	3,124	1,751	884	916	437
Balsam fir	58,616	991	1,929	2,756	6,784	9,819	8,809	7,945	14,212	2,311	1,518	1,335	-103	310
White spruce	5,901	283	75	--	798	964	546	1,556	283	--	--	1,396	--	--
Black spruce	10,639	202	1,058	747	1,161	677	787	3,024	114	--	750	1,061	1,329	-271
Northern white-cedar	12,587	24	63	97	295	2,109	877	2,511	957	1,712	243	1,805	1,864	30
Tamarack	2,498	977	202	600	--	45	144	--	--	--	397	--	--	133
Oak-hickory	4,990	--	--	75	120	951	--	759	--	1,367	1,028	490	200	--
Elm-ash-soft maple	25,976	194	1,425	634	1,717	573	3,700	1,379	1,171	4,564	1,948	3,273	2,196	3,202
Maple-birch	394,278	6,139	6,280	3,860	16,213	58,308	52,573	20,950	35,707	46,562	38,145	68,049	30,701	10,791
Aspen	119,913	5,251	3,611	1,107	12,398	29,545	36,497	13,073	9,863	5,523	1,100	1,945	--	--
Paper birch	22,920	119	187	23	918	1,296	11,135	2,705	1,470	1,162	3,556	--	278	71
Exotic	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All types	701,404	14,180	15,280	12,547	49,417	106,978	124,480	59,524	65,405	67,573	51,110	82,727	37,480	14,703

[1/] International 1/4-inch rule.

Table 52.--Net annual growth of growing stock on commercial forest land by forest type, stand-size class, and basal-area class, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	1,372	--	--	--	--	102	451	79	268	210	113	149	--	--	--
Poletimber	2,298	--	50	--	--	28	526	205	105	148	103	--	1,088	--	45
Sapling & seedling	104	--	--	11	51	16	26	--	--	--	--	--	--	--	--
All stands	3,774	--	50	11	51	146	1,003	284	373	358	216	149	1,088	--	45
Red pine															
Sawtimber	1,004	--	--	--	--	--	--	--	125	51	65	--	505	258	--
Poletimber	1,351	--	--	--	--	118	109	--	--	49	111	--	410	554	--
Sapling & seedling	52	--	--	34	--	--	18	--	--	--	--	--	--	--	--
All stands	2,407	--	--	34	--	118	127	--	125	100	176	--	915	812	--
White pine															
Sawtimber	2,241	--	--	--	30	--	--	56	216	--	330	366	442	801	--
Poletimber	455	--	--	--	--	--	--	--	252	135	68	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	2,696	--	--	--	30	--	--	56	468	135	398	366	442	801	--
Balsam fir															
Sawtimber	3,026	--	--	--	--	--	64	125	--	394	409	293	1,683	--	58
Poletimber	9,501	--	--	29	23	23	33	1,030	640	427	891	3,172	1,664	1,311	258
Sapling & seedling	1,910	2	85	11	255	267	123	534	120	123	206	123	36	25	--
All stands	14,437	2	85	40	278	290	220	1,689	760	944	1,506	3,588	3,383	1,336	316
White spruce															
Sawtimber	648	--	--	--	--	62	--	66	87	68	--	218	147	--	--
Poletimber	2,015	--	--	--	--	35	--	--	276	143	46	--	1,386	129	--
Sapling & seedling	161	--	--	82	--	36	43	--	--	--	--	--	--	--	--
All stands	2,824	--	--	82	--	133	43	66	363	211	46	218	1,533	129	--
Black spruce															
Sawtimber	128	--	--	--	--	--	--	--	44	--	--	--	84	--	--
Poletimber	3,681	--	--	--	66	107	297	80	46	455	226	1,268	840	-15	311
Sapling & seedling	2,374	3	14	17	224	403	212	500	123	36	499	188	155	--	--
All stands	6,183	3	14	17	290	510	509	580	213	491	725	1,456	1,079	-15	311
Northern white-cedar															
Sawtimber	1,060	--	--	--	--	31	12	41	90	--	134	527	181	-38	82
Poletimber	2,938	--	--	--	--	--	--	24	115	54	332	507	651	579	676
Sapling & seedling	398	--	--	6	6	106	--	10	--	54	--	38	170	8	--
All stands	4,396	--	--	6	6	137	12	75	205	108	466	1,072	1,002	549	758

(Table 52 continued on next page)

(Table 52 continued)

Forest type and stand-size class	All classes	Basal area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack															
Sawtimber	123	--	--	14	--	25	--	--	--	--	--	--	84	--	--
Poletimber	266	--	--	--	83	--	24	39	120	--	--	--	--	--	--
Sapling & seedling	538	3	32	31	77	--	--	80	143	172	--	--	--	--	--
All stands	927	3	32	45	160	25	24	119	263	172	--	--	84	--	--
Oak-hickory															
Sawtimber	396	--	--	--	--	--	--	--	--	116	86	70	--	124	--
Poletimber	619	--	--	--	--	--	--	--	--	--	--	387	232	--	--
Sapling & seedling	53	--	--	--	--	--	--	--	--	--	--	53	--	--	--
All stands	1,068	--	--	--	--	--	--	--	--	116	86	510	232	124	--
Elm-ash-soft maple															
Sawtimber	2,617	--	--	--	17	--	23	--	--	157	170	393	1,154	560	143
Poletimber	3,613	--	--	29	144	19	--	180	240	193	833	417	464	941	153
Sapling & seedling	1,124	--	37	--	30	59	152	505	130	--	184	27	--	--	--
All stands	7,354	--	37	29	191	78	175	685	370	350	1,187	837	1,618	1,501	296
Maple-birch															
Sawtimber	45,303	--	--	--	20	160	314	722	2,008	1,555	5,951	11,357	15,537	6,374	1,305
Poletimber	56,409	--	--	--	--	648	536	3,023	3,552	3,562	6,597	12,752	19,331	6,110	298
Sapling & seedling	6,699	2	67	52	312	837	727	1,141	1,028	1,091	298	751	393	--	--
All stands	108,411	2	67	52	332	1,645	1,577	4,886	6,588	6,208	12,846	24,860	35,261	12,484	1,603
Aspen															
Sawtimber	5,165	--	124	--	52	118	339	335	487	836	230	708	1,038	898	--
Poletimber	22,084	--	--	37	285	658	890	1,722	1,973	1,825	2,420	4,872	5,163	1,530	709
Sapling & seedling	4,743	106	318	596	705	1,252	527	422	256	22	238	301	--	--	--
All stands	31,992	106	442	633	1,042	2,028	1,756	2,479	2,716	2,683	2,888	5,881	6,201	2,428	709
Paper birch															
Sawtimber	724	--	--	--	35	--	--	--	--	52	43	434	150	--	10
Poletimber	6,978	--	--	--	--	116	115	127	464	654	422	717	3,747	616	--
Sapling & seedling	472	--	2	33	13	77	--	53	49	102	--	143	--	--	--
All stands	8,174	--	2	33	48	193	115	180	513	808	465	1,294	3,897	616	10
Exotic															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	28	15	13	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	63,807	--	124	14	154	498	1,203	1,424	3,325	3,439	7,531	14,515	21,005	8,977	1,598
Poletimber	112,208	--	50	95	601	1,752	2,530	6,430	7,783	7,645	12,049	24,092	34,976	11,755	2,450
Sapling & seedling	18,628	116	555	873	1,673	3,053	1,828	3,245	1,849	1,600	1,425	1,624	754	33	--
Nonstocked	28	15	13	--	--	--	--	--	--	--	--	--	--	--	--
All stands	194,671	131	742	982	2,428	5,303	5,561	11,099	12,957	12,684	21,005	40,231	56,735	20,765	4,048

Table 53.--Net annual growth of sawtimber on commercial forest land by forest type, stand-size class, and basal-area class, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Forest type and stand-size class	All classes	Basal area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	9,768	--	--	--	--	396	5,429	173	646	1,494	810	820	--	--	--
Poletimber	9,414	--	921	--	--	--	2,354	910	39	650	1,156	--	2,901	--	483
Sapling & seedling	207	--	--	--	103	79	25	--	--	--	--	--	--	--	--
All stands	19,389	--	921	--	103	475	7,808	1,083	685	2,144	1,966	820	2,901	--	483
Red pine															
Sawtimber	7,153	--	--	--	--	--	--	--	1,653	99	666	--	2,646	2,089	--
Poletimber	5,565	--	--	--	--	211	1,596	--	--	491	107	--	185	2,975	--
Sapling & seedling	67	--	--	--	--	--	67	--	--	--	--	--	--	--	--
All stands	12,785	--	--	--	--	211	1,663	--	1,653	590	773	--	2,831	5,064	--
White pine															
Sawtimber	10,476	--	--	--	113	--	--	229	1,046	--	1,517	1,629	1,386	4,556	--
Poletimber	436	--	--	--	--	--	--	--	235	77	124	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	10,912	--	--	--	113	--	--	229	1,281	77	1,641	1,629	1,386	4,556	--
Balsam fir															
Sawtimber	14,879	--	--	--	--	--	750	172	--	2,956	1,060	1,674	7,850	--	417
Poletimber	38,282	--	--	33	21	399	31	5,846	2,351	710	2,995	9,746	9,083	6,027	1,040
Sapling & seedling	5,455	10	68	60	1,822	176	553	2,256	61	97	228	36	88	--	--
All stands	58,616	10	68	93	1,843	575	1,334	8,274	2,412	3,763	4,283	11,456	17,021	6,027	1,457
White spruce															
Sawtimber	2,255	--	--	--	--	288	--	288	283	131	--	819	446	--	--
Poletimber	3,289	--	--	--	--	65	--	--	660	79	124	--	805	1,556	--
Sapling & seedling	357	--	--	113	--	169	75	--	--	--	--	--	--	--	--
All stands	5,901	--	--	113	--	522	75	288	943	210	124	819	1,251	1,556	--
Black spruce															
Sawtimber	1,511	--	--	--	--	--	--	--	150	--	--	--	1,361	--	--
Poletimber	7,060	--	--	--	85	46	184	155	48	25	876	1,763	3,052	806	20
Sapling & seedling	2,068	--	--	--	70	1,123	80	60	61	77	597	--	--	--	--
All stands	10,639	--	--	--	155	1,169	264	215	259	102	1,473	1,763	4,413	806	20
Northern white-cedar															
Sawtimber	4,298	--	--	--	--	47	52	151	110	--	365	991	1,271	401	910
Poletimber	8,067	--	--	--	--	--	--	13	64	99	1,237	571	1,905	1,295	2,883
Sapling & seedling	222	--	--	18	--	--	--	7	--	87	--	61	46	3	--
All stands	12,587	--	--	18	--	47	52	171	174	186	1,602	1,623	3,222	1,699	3,793

(Table 53 continued on next page)

(Table 53 continued)

Forest type and stand-size class	All classes	Basal area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Tamarack															
Sawtimber	575	--	--	56	--	133	--	--	--	--	--	--	386	--	--
Poletimber	144	--	--	--	6	--	50	7	81	--	--	--	--	--	--
Sapling & seedling	1,779	--	912	65	699	--	--	--	8	95	--	--	--	--	--
All stands	2,498	--	912	121	705	133	50	7	89	95	--	--	386	--	--
Oak-hickory															
Sawtimber	3,085	--	--	--	--	--	--	--	--	558	247	1,367	--	913	--
Poletimber	1,830	--	--	--	--	--	--	--	--	--	--	1,066	764	--	--
Sapling & seedling	75	--	--	--	--	--	--	--	--	--	--	75	--	--	--
All stands	4,990	--	--	--	--	--	--	--	--	558	247	2,508	764	913	--
Elm-ash-soft maple															
Sawtimber	13,904	--	--	--	33	--	83	--	--	670	862	3,017	5,191	3,440	608
Poletimber	10,335	--	--	--	517	-7	--	720	130	99	2,642	1,963	1,523	2,093	655
Sapling & seedling	1,737	--	30	--	113	54	7	25	161	--	1,340	7	--	--	--
All stands	25,976	--	30	--	663	47	90	745	291	769	4,844	4,987	6,714	5,533	1,263
Maple-birch															
Sawtimber	233,516	--	--	--	63	1,190	744	3,091	9,400	7,769	28,376	58,201	82,972	36,703	5,007
Poletimber	145,684	--	--	--	--	1,330	128	4,799	8,468	6,639	17,299	30,332	56,883	19,304	502
Sapling & seedling	15,078	9	22	745	757	420	1,143	3,179	662	3,208	1,867	2,949	117	--	--
All stands	394,278	9	22	745	820	2,940	2,015	11,069	18,530	17,616	47,542	91,482	139,972	56,007	5,509
Aspen															
Sawtimber	29,205	--	73	--	161	871	1,256	3,255	5,096	2,910	547	5,380	6,721	2,935	--
Poletimber	81,735	--	--	92	67	879	2,534	10,594	6,281	7,684	8,159	21,737	12,470	5,571	5,667
Sapling & seedling	8,973	--	705	952	4,184	839	1,032	542	458	24	105	132	--	--	--
All stands	119,913	--	778	1,044	4,412	2,589	4,822	14,391	11,835	10,618	8,811	27,249	19,191	8,506	5,667
Paper birch															
Sawtimber	5,671	--	--	--	141	--	--	--	--	119	528	1,698	3,141	--	44
Poletimber	16,919	--	--	--	--	41	14	82	861	153	231	1,609	10,255	3,673	--
Sapling & seedling	330	--	--	59	43	--	--	116	61	43	--	8	--	--	--
All stands	22,920	--	--	59	184	41	14	198	922	315	759	3,315	13,396	3,673	44
Exotic															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	336,296	--	73	56	511	2,925	8,314	7,359	18,384	16,706	34,978	75,596	113,371	51,037	6,986
Poletimber	328,760	--	921	125	696	2,964	6,891	23,126	19,218	16,706	34,950	68,787	99,826	43,300	11,250
Spling & seedling	36,348	19	1,737	2,012	7,791	2,860	2,982	6,185	1,472	3,631	4,137	3,268	251	3	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	701,404	19	2,731	2,193	8,998	8,749	18,187	36,670	39,074	37,043	74,065	147,651	213,448	94,340	18,236

1/International 1/4-inch rule.

Table 54.--Timber removals[1/] from growing stock on commercial forest land by species group and county, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
SOFTWOODS									
White pine	2,409	171	243	332	440	264	109	649	201
Red pine	1,945	125	227	209	250	379	22	548	185
Jack pine	2,889	44	137	133	497	529	1	1,379	169
White spruce	1,100	84	81	60	71	389	35	277	103
Black spruce	921	73	114	47	29	323	20	298	17
Balsam fir	3,816	313	387	240	132	1320	30	1,107	287
Hemlock	3,868	746	93	712	284	456	97	957	523
Tamarack	79	5	11	9	5	25	--	22	2
Northern white-cedar	976	60	173	50	52	78	75	459	29
Other softwoods	--	--	--	--	--	--	--	--	--
Total	18,003	1,621	1,466	1,792	1,760	3,763	389	5,696	1,516
HARDWOODS									
Select white oaks	23	--	6	--	15	--	--	1	1
Select red oaks	1,417	63	56	112	335	86	266	406	93
Other red oaks	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--
Yellow birch	3,224	491	52	423	429	546	173	556	554
Hard maple	14,549	1,921	452	1,813	1,949	1,825	716	3,541	2,332
Soft maple	6,075	840	485	418	806	763	292	1,619	852
Beech	101	1	3	--	--	--	--	97	--
Ash	547	39	67	109	30	66	18	47	171
Balsam poplar	651	64	269	--	10	13	1	289	5
Cottonwood	--	--	--	--	--	--	--	--	--
Bigtooth aspen	3,792	491	689	305	319	593	5	929	461
Quaking aspen	22,510	1,999	4,901	3,191	2,157	4,010	56	1,837	4,359
Basswood	1,153	74	83	190	133	190	27	175	281
Yellow-poplar	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--
Elm	3,351	434	225	391	274	1,042	47	440	498
Paper birch	2,574	228	645	94	198	361	34	850	164
Other hardwoods[2/]	332	60	16	33	36	107	1	42	37
Total	60,299	6,705	7,949	7,079	6,691	9,602	1,636	10,829	9,808
All species	78,302	8,326	9,415	8,871	8,451	13,365	2,025	16,525	11,324

[1/] Removals in 1979 are trend-level removals.
[2/] Includes black cherry.

Table 55.--Timber removals[1/] from sawtimber on commercial forest land by species group and county, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[2/]

Species group	All counties	County							
		Baraga	Dickinson	Gogebic	Houghton	Iron	Keweenaw	Marquette	Ontonagon
SOFTWOODS									
White pine	12,010	772	1,294	1,791	2,452	1,199	559	2,998	945
Red pine	7,770	361	1,131	903	1,224	1,365	110	2,037	639
Jack pine	7,680	93	573	530	1,540	1,289	2	3,180	473
White spruce	4,233	305	393	225	228	1,507	133	1,152	290
Black spruce	956	60	105	39	32	352	34	322	12
Balsam fir	9,512	767	988	540	302	3,432	41	2,757	685
Hemlock	13,748	2,707	239	2,853	964	1,429	389	3,459	1,708
Tamarack	147	6	16	26	5	47	--	42	5
Northern white-cedar	2,130	167	468	125	132	194	139	830	75
Other softwoods	--	--	--	--	--	--	--	--	--
Total	58,186	5,238	5,207	7,032	6,879	10,814	1,407	16,777	4,832
HARDWOODS									
Select white oaks	94	--	3	--	80	--	--	7	4
Select red oaks	4,832	199	149	436	1,480	223	966	933	446
Other red oaks	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--
Yellow birch	12,551	1,890	171	1,670	1,577	2,037	864	2,548	1,794
Hard maple	62,127	8,096	1,308	8,166	8,572	6,948	3,527	16,830	8,680
Soft maple	9,885	1,177	609	625	1,612	1,230	738	2,515	1,379
Beech	519	5	11	--	--	--	--	503	--
Ash	1,507	121	125	429	73	179	88	124	368
Balsam poplar	1,108	99	486	--	53	20	--	434	16
Cottonwood	--	--	--	--	--	--	--	--	--
Bigtooth aspen	11,389	1,554	1,813	1,667	1,307	1,556	13	1,963	1,516
Quaking aspen	60,776	5,009	7,620	12,663	8,691	8,672	131	3,533	14,457
Basswood	4,466	314	284	788	598	765	138	826	753
Yellow-poplar	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--	--	--
Elm	10,987	1,259	740	1,396	738	3,717	231	1,543	1,363
Paper birch	4,842	385	973	302	638	662	64	1,515	303
Other hardwoods[3/]	539	90	21	43	55	192	1	72	65
Total	185,622	20,198	14,313	28,185	25,474	26,201	6,761	33,346	31,144
All species	243,808	25,436	19,520	35,217	32,353	37,015	8,168	50,123	35,976

1/ Removals in 1979 are trend-level removals.
2/ International 1/4-inch rule.
3/ Includes black cherry.

Table 56.--Timber removals[1] from growing stock and sawtimber on commercial forest land by species group, Western Upper Peninsula, Michigan, 1965 and 1979

Species group	Growing stock		Sawtimber	
	[2]1965	1979	[2]1965	1979
	Thousand cubic feet		[3]Thousand board feet	
SOFTWOODS				
White pine	1,325	2,409	7,876	12,010
Red pine	326	1,945	1,559	7,770
Jack pine	3,560	2,889	9,690	7,680
White spruce	1,679	1,100	8,437	4,233
Black spruce	1,703	921	3,689	956
Balsam fir	2,933	3,816	8,820	9,512
Hemlock	7,933	3,868	41,467	13,748
Tamarack	284	79	1,118	147
Northern white-cedar	1,522	976	3,279	2,130
Other softwoods	--	--	--	--
Total	21,265	18,003	85,935	58,186
HARDWOODS				
Select white oaks	123	23	797	94
Select red oaks	791	1,417	2,910	4,832
Other red oaks	--	--	--	--
Hickory	--	--	--	--
Yellow birch	5,263	3,224	29,703	12,551
Hard maple	15,300	14,549	79,954	62,127
Soft maple	2,559	6,075	6,358	9,885
Beech	353	101	1,921	519
Ash	257	547	1,207	1,507
Balsam poplar	73	651	326	1,108
Cottonwood	--	--	--	--
Bigtooth aspen	2,563	3,792	11,700	11,389
Quaking aspen	16,953	22,510	38,846	60,776
Basswood	840	1,153	4,426	4,466
Yellow-poplar	--	--	--	--
Black walnut	--	--	--	--
Butternut	--	--	--	--
Elm	993	3,351	5,454	10,987
Paper birch	537	2,574	2,001	4,842
Other hardwoods[4]	613	332	3,431	539
Total	47,218	60,299	189,034	185,622
All species	68,483	78,302	274,969	243,808

[1]Removals in 1979 are trend-level removals.
[2]Figures have been adjusted from those published after the 1966 survey to conform to 1980 volumes because of changes in survey definitions and procedures.
[3]International 1/4-inch rule.
[4]Includes black cherry.

Table 57.--Timber removals[1] from growing stock and sawtimber on commercial forest land by item and species category, Western Upper Peninsula, Michigan, 1979

Item	Growing stock						Sawtimber					
	All species	Pine	Other softwoods	Aspen	Hard maple	Other hardwoods	All species	Pine	Other softwoods	Aspen	Hard maple	Other hardwoods
	Thousand cubic feet						[2] Thousand board feet					
ROUNDWOOD PRODUCTS												
Pulpwood	36,241	3,481	6,371	15,922	2,939	7,528	72,030	8,170	16,948	26,997	7711	12,204
Saw logs	20,116	3,143	1,224	5,030	6,126	4,593	112,493	18,137	7,034	24,508	37,196	25,618
Fuelwood	645	[4]	7	40	307	291	2,147	7	23	140	1,009	968
Posts	333	--	333	--	--	--	343	--	343	--	--	--
Veneer logs	2,934	[4]	--	2,120	542	272	21,450	1	--	15,500	3,958	1,991
Poles	14	14	--	--	--	--	57	57	--	--	--	--
Other[3]	50	2	18	--	30	--	271	8	70	--	193	--
Total	60,333	6,640	7,953	23,112	9,944	12,684	208,791	26,380	24,418	67,145	50,067	40,781
LOGGING RESIDUE	4,391	281	378	1,314	1,212	1,206	8,744	423	927	1,998	3,160	2,236
OTHER REMOVALS	13,578	322	2,429	1,876	3,393	5,558	26,273	657	5,381	3,022	8,900	8,313
TOTAL REMOVALS	78,302	7,243	10,760	26,302	14,549	19,448	243,808	27,460	30,726	72,165	62,127	51,330

[1] Removals in 1979 are trend-level removals.
[2] International 1/4-inch rule.
[3] Includes charcoal wood, shingle bolts, cabin logs, particleboard bolts, piling, etc.
[4] Less than 500 cubic feet.

Table 58.--Net annual growth and removals[1/] of growing stock on commercial forest land by species group, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	Net annual growth	Annual timber removals
SOFTWOODS		
White pine	4,794	2,409
Red pine	3,030	1,945
Jack pine	3,999	2,889
White spruce	12,811	1,100
Black spruce	4,936	921
Balsam fir	16,748	3,816
Hemlock	6,260	3,868
Tamarack	841	79
Northern white-cedar	7,331	976
Other softwoods	86	--
Total	60,836	18,003
HARDWOODS		
Select white oaks	17	23
Select red oaks	2,599	1,417
Other red oaks	--	--
Hickory	--	--
Yellow birch	6,723	3,224
Hard maple	49,016	14,549
Soft maple	31,444	6,075
Beech	11	101
Ash	7,914	547
Balsam poplar	917	651
Cottonwood	6	--
Bigtooth aspen	2,295	3,792
Quaking aspen	15,664	22,510
Basswood	7,530	1,153
Yellow-poplar	--	--
Black walnut	--	--
Butternut	--	--
Elm	-1,291	3,351
Paper birch	8,873	2,574
Other hardwoods[2/]	2,117	332
Total	133,835	60,299
All species	194,671	78,302

[1/] Removals in 1979 are trend-level removals.
[2/] Includes black cherry.

Table 59.--Net annual growth and removals[1/] of sawtimber on commercial forest land by species group, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[2/]

Species group	Net annual growth	Annual timber removals
SOFTWOODS		
White pine	25,759	12,010
Red pine	12,329	7,770
Jack pine	21,954	7,680
White spruce	53,710	4,233
Black spruce	5,499	956
Balsam fir	44,394	9,512
Hemlock	37,543	13,748
Tamarack	3,722	147
Northern white-cedar	32,141	2,130
Other softwoods	8	--
Total	237,059	58,186
HARDWOODS		
Select white oaks	104	94
Select red oaks	15,496	4,832
Other red oaks	--	--
Hickory	--	--
Yellow birch	19,639	12,551
Hard maple	139,326	62,127
Soft maple	79,450	9,885
Beech	8	519
Ash	31,615	1,507
Balsam poplar	4,484	1,108
Cottonwood	27	--
Bigtooth aspen	17,011	11,389
Quaking aspen	93,060	60,776
Basswood	29,144	4,466
Yellow-poplar	--	--
Black walnut	--	--
Butternut	--	--
Elm	1,630	10,987
Paper birch	28,787	4,842
Other hardwoods[3/]	4,564	539
Total	464,345	185,622
All species	701,404	243,808

1/Removals in 1979 are trend-level removals.

2/International 1/4-inch rule.

3/Includes black cherry.

Table 60.--Net annual growth and removals[1/] of growing stock on commercial forest land by ownership class and softwoods and hardwoods, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	33,821	12,275	21,546	7,634	1,885	5,749
Bureau of Land Mgmt.	--	--	--	--	--	--
Miscellaneous federal	50	43	7	--	--	--
Indian	695	150	545	115	10	105
State	25,323	10,120	15,203	7,750	1,941	5,809
County and municipal	3,800	963	2,837	907	176	731
Forest industry	53,914	17,095	36,819	17,647	4,619	13,028
Farmer	9,397	2,198	7,199	[2/]44,249	[2/]9,372	[2/]34,877
Misc. private-corp.	29,208	6,970	22,238	--	--	--
Misc. private-indiv.	38,463	11,022	27,441	--	--	--
All owners	194,671	60,836	133,835	78,302	18,003	60,299

[1/]Removals in 1979 are trend-level removals.

[2/]Includes miscellaneous private-corporation and miscellaneous private-individual.

Table 61.--Net annual growth and removals[1/] of sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[2/]

Ownership class	Net annual growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	144,249	53,342	90,907	17,577	5,448	12,129
Bureau of Land Mgmt.	--	--	--	--	--	--
Miscellaneous federal	698	673	25	--	--	--
Indian	1,525	303	1,222	207	21	186
State	93,412	42,635	50,777	17,768	5,309	12,459
County and municipal	13,923	3,363	10,560	2,129	430	1,699
Forest industry	198,136	61,541	136,595	52,819	14,513	38,306
Farmer	31,396	6,370	25,026	[3]153,308	[3] /32,465	[3]/120,843
Misc. private-corp.	99,443	32,929	66,514	--	--	--
Misc. private-indiv.	118,622	35,903	82,719	--	--	--
All owners	701,404	237,059	464,345	243,808	58,186	185,622

[1/]Removals in 1979 are trend-level removals.

[2/]International 1/4-inch rule.

[3/]Includes miscellaneous private-corporation and miscellaneous private-individual.

Table 62.--Annual mortality of growing stock on commercial forest land by softwoods and hardwoods, Western Upper Peninsula, Michigan, 1965 and 1979

(In million cubic feet)

Species	1/1965	1979
Softwoods	10.3	14.0
Hardwoods	26.9	34.3
Total	37.2	48.3

1/Figures have been adjusted from those published after the 1966 survey to conform to 1979 volumes because of changes in survey definitions and procedures.

Table 63.--Annual mortality of growing stock on commercial forest land by species group and cause, Western Upper Peninsula, Michigan, 1979

(In thousand cubic feet)

Species group	All causes	Cause						
		Insects	Disease	Fire	Animals	Weather	Suppression	Unknown and other
SOFTWOODS								
White pine	241	5	132	--	--	13	--	91
Red pine	12	--	5	--	--	--	7	--
Jack pine	372	34	95	--	15	53	--	175
White spruce	890	110	61	--	--	268	9	442
Black spruce	1,015	53	259	--	10	202	10	481
Balsam fir	9,264	499	2,054	--	55	1,963	15	4,678
Hemlock	343	--	90	--	--	30	--	223
Tamarack	917	--	266	--	--	--	--	651
Northern white-cedar	918	--	276	--	40	171	--	431
Other softwoods	--	--	--	--	--	--	--	--
Total	13,972	701	3,238	--	120	2,700	41	7,172
HARDWOODS								
Select white oaks	2	--	2	--	--	--	--	--
Select red oaks	394	--	56	--	--	42	--	296
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	2,328	--	989	--	--	158	--	1,181
Hard maple	5,774	--	2,003	--	216	1,381	61	2,113
Soft maple	1,447	--	594	--	--	158	--	695
Beech	2	--	--	--	--	--	--	2
Ash	906	--	296	--	--	--	--	610
Balsam poplar	791	--	460	--	--	122	--	209
Cottonwood	1	--	--	--	--	1	--	--
Bigtooth aspen	1,626	--	1,173	--	--	93	--	360
Quaking aspen	12,118	43	7,052	--	177	1,522	69	3,255
Basswood	781	--	219	--	--	187	--	375
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	230	--	31	--	--	--	--	199
Butternut	--	--	--	--	--	--	--	--
Elm	7,217	62	6,110	--	--	--	--	1,045
Paper birch	741	--	292	--	15	43	15	376
Other hardwoods	1	--	--	--	--	--	--	1
Total	34,359	105	19,277	--	408	3,707	145	10,717
All species	48,331	806	22,515	--	528	6,407	186	17,889

Table 64.--Annual mortality of sawtimber on commercial forest land by species group and cause, Western Upper Peninsula, Michigan, 1979

(In thousand board feet)[1/]

Species group	All causes	Cause						
		Insects	Disease	Fire	Animals	Weather	Suppression	Unknown and other
SOFTWOODS								
White pine	1,132	25	627	--	--	74	--	406
Red pine	--	--	--	--	--	--	--	--
Jack pine	1,231	--	808	--	153	--	--	270
White spruce	3,253	401	258	--	--	1,398	--	1,196
Black spruce	2,708	156	878	--	--	138	104	1,432
Balsam fir	14,382	636	3,712	--	198	4,623	--	5,213
Hemlock	1,645	--	416	--	--	143	--	1,086
Tamarack	1,375	--	1,375	--	--	--	--	--
Northern white-cedar	2,910	--	866	--	44	558	--	1,442
Other softwoods	1	--	--	--	--	--	--	1
Total	28,637	1,218	8,940	--	395	6,934	104	11,046
HARDWOODS								
Select white oaks	11	--	2	--	--	1	--	8
Select red oaks	1,362	--	244	--	--	--	--	1,118
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	9,135	--	3,345	--	--	1,090	--	4,700
Hard maple	15,910	--	7,240	--	--	3,330	--	5,340
Soft maple	2,632	--	844	--	--	469	--	1,319
Beech	3	--	2	--	--	--	--	1
Ash	1,822	--	711	--	--	--	--	1,111
Balsam poplar	2,817	--	1,852	--	--	--	--	965
Cottonwood	3	--	2	--	--	--	--	1
Bigtooth aspen	4,440	--	3,316	--	--	1,124	--	--
Quaking aspen	25,180	--	9,683	--	598	6,461	--	8,438
Basswood	1,904	--	759	--	--	796	--	349
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	217	--	30	--	--	--	--	187
Butternut	--	--	--	--	--	--	--	--
Elm	18,675	164	15,813	--	--	--	--	2,698
Paper birch	1,273	--	535	--	--	349	--	389
Other hardwoods	1	--	1	--	--	--	--	--
Total	85,385	164	44,379	--	598	13,620	0	26,624
All species	114,022	1,382	53,319	--	993	20,554	104	37,670

[1/] International 1/4-inch rule.

Table 65.--Annual mortality of growing stock and sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Western Upper Peninsula, Michigan, 1979

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	- - - Thousand cubic feet - - -			- - - [1/] Thousand board feet - - -		
National Forest	9,734	2,723	7,011	20,697	5,035	15,662
Bureau of Land Management	--	--	--	--	--	--
Miscellaneous federal	239	7	232	574	21	553
Indian	33	31	2	95	88	7
State	6,692	2,612	4,080	14,244	4,588	9,656
County and municipal	927	208	719	2,018	428	1,590
Forest industry	11,869	3,475	8,394	31,007	7,123	23,884
Farmer	1,976	279	1,697	4,404	453	3,951
Misc. private-corp.	7,550	2,365	5,185	19,671	6,033	13,638
Misc. private-indiv.	9,311	2,272	7,039	21,312	4,868	16,444
All owners	48,331	13,972	34,359	114,022	28,637	85,385

[1/] International 1/4-inch rule.

Table 66.--Output of timber products by source of material and softwoods and hardwoods, Western Upper Peninsula, Michigan, 1978

Product	Standard units	Total		Roundwood products: Growing stock		Roundwood products: Nongrowing stock		Plant byproducts	
		No. of units	Thousand cubic feet	No. of units	Thousand cubic feet	No. of units	Thousand cubic feet	No. of units	Thousand cubic feet
PULPWOOD									
Softwood	1/Standard	143,486	11,327	124,805	9,852	13,301	1,050	5,380	425
Hardwood	cords	432,265	34,131	334,227	26,389	65,100	5,140	32,938	2,602
Total		575,751	45,458	459,032	36,241	78,401	6,190	38,318	3,027
SAW LOGS									
Softwood	2/Thousand	26,394	4,496	25,637	4,367	757	129	--	--
Hardwood	board feet	95,609	16,185	93,033	15,749	2,576	436	--	--
Total		122,003	20,681	118,670	20,116	3,333	565	--	--
VENEER LOGS									
Softwood	2/Thousand	1	--	1	--	--	--	--	--
Hardwood	board feet	21,449	2,934	21,449	2,934	--	--	--	--
Total		21,450	2,934	21,450	2,934	--	--	--	--
FUELWOOD									
Softwood	1/Standard	3,952	268	130	7	408	22	3,414	239
Hardwood	cords	57,453	4,005	9,179	638	24,960	1,735	23,314	1,632
Total		61,405	4,273	9,309	645	25,368	1,757	26,728	1,871
POSTS									
Softwood	Thousand	356	365	325	333	31	32	--	--
Hardwood	pieces	--	--	--	--	--	--	--	--
Total		356	365	325	333	31	32	--	--
POLES									
Softwood	Pieces	1,674	14	1,674	14	--	--	--	--
Hardwood		--	--	--	--	--	--	--	--
Total		1,674	14	1,674	14	--	--	--	--
OTHER 3/									
Softwood	Thousand	41	41	20	20	3	3	18	18
Hardwood	cubic feet	1,324	1,324	30	30	--	--	1,294	1,294
Total		1,365	1,365	50	50	3	3	1,312	1,312
ALL PRODUCTS									
Softwood	Thousand	--	16,511	--	14,593	--	1,236	--	682
Hardwood	cubic feet	--	58,579	--	45,740	--	7,311	--	5,528
Total		--	75,090	--	60,333	--	8,547	--	6,210

1/Rough-wood, 128 cubic foot basis.

2/International 1/4-inch rule.

3/Other (industrial production) includes cabin logs, charcoal wood, particleboard bolts, shingle bolts, piling, etc.

Table 67.--Output of roundwood products by source and softwoods and hardwoods, Western Upper Peninsula, Michigan, 1978

(In thousand cubic feet)

Product and species group	All sources	Growing-stock trees			Rough and rotten trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
INDUSTRIAL PRODUCTS							
Saw logs							
Softwood	4,496	4,367	4,298	69	1	47	81
Hardwood	16,185	15,749	14,725	1,024	121	11	304
Subtotal	20,681	20,116	19,023	1,093	122	58	385
Veneer logs and bolts							
Softwood	--	--	--	--	--	--	--
Hardwood	2,934	2,934	2,934	--	--	--	--
Subtotal	2,934	2,934	2,934	--	--	--	--
Pulpwood							
Softwood	10,902	9,852	6,533	3,319	210	216	624
Hardwood	31,529	26,389	11,820	14,569	2,808	261	2,071
Subtotal	42,431	36,241	18,353	17,888	3,018	477	2,695
Cooperage							
Softwood	--	--	--	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Subtotal	--	--	--	--	--	--	--
Piling							
Softwood	2	2	2	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Subtotal	2	2	2	--	--	--	--
Poles							
Softwood	14	14	12	2	--	--	--
Hardwood	--	--	--	--	--	--	--
Subtotal	14	14	12	2	--	--	--
Mine timbers (Round)							
Softwood	14	11	9	2	--	3	--
Hardwood	30	30	30	--	--	--	--
Subtotal	44	41	39	2	--	3	--
Posts (Round and split)							
Softwood	365	333	88	245	4	--	28
Hardwood	--	--	--	--	--	--	--
Subtotal	365	333	88	245	4	--	28
Other							
Softwood	7	7	4	3	--	--	--
Hardwood	--	--	--	--	--	--	--
Subtotal	7	7	4	3	--	--	--
All industrial products							
Softwood	15,800	14,586	10,946	3,640	215	266	733
Hardwood	50,678	45,102	29,509	15,593	2,929	272	2,375
Total	66,478	59,688	40,455	19,233	3,144	538	3,108
FUELWOOD							
Softwood	29	7	4	3	1	2	19
Hardwood	2,373	638	370	268	133	143	1,459
Total	2,402	645	374	271	134	145	1,478
ALL PRODUCTS							
Softwood	15,829	14,593	10,950	3,643	216	268	752
Hardwood	53,051	45,740	29,879	15,861	3,062	415	3,834
Total	68,880	60,333	40,829	19,504	3,278	683	4,586

Table 68.--Timber products from roundwood by species group and product, Western Upper Peninsula, Michigan, 1978

Species group	All Products		Pulpwood	Saw logs		Veneer logs	
	[1]/Thousand cubic feet	Cords	[1]/Thousand cubic feet	[2]/Thousand board feet	[1]/Thousand cubic feet	[2]/Thousand board feet	[1]/Thousand cubic feet
SOFTWOODS							
White pine	2,254	5,419	429	10,856	1,822	1	--
Red pine	1,963	13,346	1,053	5,323	893	--	--
Jack pine	3,046	31,883	2,520	2,792	525	--	--
White spruce	859	9,630	759	524	96	--	--
Black spruce	720	8,063	636	438	81	--	--
Balsam fir	3,410	42,593	3,362	63	12	--	--
Hemlock	2,932	24,315	1,922	5,877	986	--	--
Tamarack	44	533	40	24	4	--	--
Northern white-cedar	601	2,324	181	497	77	--	--
Other softwoods	--	--	--	--	--	--	--
Total	15,829	138,106	10,902	26,394	4,496	1	--
HARDWOODS							
Select white oaks	22	105	7	93	15	--	--
Select red oaks	590	670	51	2,462	429	806	110
Other red oaks	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--
Yellow birch	2,645	18,516	1,461	5,882	989	726	99
Hard maple	12,799	60,111	4,747	39,288	6,343	3,958	542
Soft maple	3,734	34,567	2,731	4,977	874	77	10
Beech	102	263	21	481	81	--	--
Ash	477	3,553	282	926	159	--	--
Balsam poplar	685	8,564	674	61	11	--	--
Cottonwood	--	--	--	--	--	--	--
Bigtooth aspen	3,568	31,630	2,499	4,204	740	2,235	306
Quaking aspen	21,171	187,759	14,832	24,956	4,390	13,265	1,814
Basswood	818	2,457	193	3,535	619	40	5
Yellow-poplar	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--
Elm	3,285	20,354	1,607	7,161	1,257	232	32
Paper birch	2,867	27,358	2,157	1,460	257	110	16
Other hardwoods[3]/	288	3,420	267	123	21	--	--
Total	53,051	399,327	31,529	95,609	16,185	21,449	2,934
All species	68,880	537,433	42,431	122,003	20,681	21,450	2,934

(Table 68 continued on next page)

[1]/Small quantities may round off to less than 500 cubic feet and will be shown as a dash in columns showing thousand cubic feet.

[2]/International 1/4-inch rule.

[3]/Includes black cherry.

(Table 68 continued)

Species group	Fuelwood		Posts		Poles		Other Products
	Cords	1/Thousand cubic feet	Thousand pieces	1/Thousand cubic feet	Pieces	1/Thousand cubic feet	1/Thousand cubic feet
SOFTWOODS							
White pine	73	3	--	--	--	--	--
Red pine	45	1	--	--	1,674	14	2
Jack pine	43	1	--	--	--	--	--
White spruce	--	--	4	4	--	--	--
Black spruce	--	--	3	3	--	--	--
Balsam fir	--	--	35	36	--	--	--
Hemlock	346	24	--	--	--	--	--
Tamarack	--	--	--	--	--	--	--
Northern white-cedar	31	--	314	322	--	--	21
Other softwoods	--	--	--	--	--	--	--
Total	538	29	356	365	1,674	14	23
HARDWOODS							
Select white oaks	--	--	--	--	--	--	--
Select red oaks	40	--	--	--	--	--	--
Other red oaks	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--
Yellow birch	1,407	96	--	--	--	--	--
Hard maple	16,263	1,137	--	--	--	--	30
Soft maple	1,727	119	--	--	--	--	--
Beech	--	--	--	--	--	--	--
Ash	558	36	--	--	--	--	--
Balsam poplar	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--
Bigtooth aspen	325	23	--	--	--	--	--
Quaking aspen	1,927	135	--	--	--	--	--
Basswood	28	1	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--
Butternut	--	--	--	--	--	--	--
Elm	5,575	389	--	--	--	--	--
Paper birch	6,279	437	--	--	--	--	--
Other hardwoods	10	--	--	--	--	--	--
Total	34,139	2,373	--	--	--	--	30
All species	34,677	2,402	356	365	1,674	14	53

Table 69.--Volume of primary plant residue by kind of material and type of use, Western Upper Peninsula, Michigan, 1978

(In thousand cubic feet)

Type of use	Kind of wood residue							
	Total		Coarse[1]		Fine[2]		Bark[3]	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Fiber products[4]	374.1	3,778.5	368.8	3,727.1	5.3	51.4	15.0	107.0
Charcoal	--	--	--	--	--	--	--	--
Industrial fuel	193.2	1,431.5	21.6	90.8	171.6	1,340.7	174.0	1,252.2
Domestic fuel	45.7	200.5	45.7	200.5	--	--	17.4	90.3
Miscellaneous[5]	18.0	117.1	8.4	6.8	9.6	110.3	2.9	19.4
Not used[6]	103.6	1,839.2	19.2	57.1	84.4	1,782.1	83.4	1,565.3
Total	734.6	7,366.8	463.7	4,082.3	270.9	3,284.5	292.7	3,034.2

1/Suitable for chipping such as slabs, edgings, veneer cores, etc.
2/Not suitable for chipping such as sawdust, veneer clippings, etc.
3/Does not include bark disposal at pulpmills.
4/For manufacture of pulp, hardboard, or roofing felt.
5/Livestock bedding, mulch, small dimension, and specialty items.
6/Includes residue burned as waste.

Table 70.--All live shrub[1/] biomass yields on commercial forest land by shrub species group and forest type, Western Upper Peninsula, Michigan, 1980

(In pounds per acre)

Shrub spcies group	Forest type														
	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
TALL SHRUBS															
Balsam fir	32.0	196.0	298.8	402.0	59.6	93.2	408.4	305.6	461.2	178.0	118.0	162.8	259.6	--	--
Tamarack	--	--	--	--	--	6.4	--	119.6	--	--	--	4.0	36.4	--	--
White spruce	--	--	--	9.2	10.8	--	10.4	--	71.6	20.8	4.8	--	18.0	--	--
Black spruce	32.8	--	--	31.6	--	460.0	14.8	248.0	--	21.2	--	--	--	--	--
Jack pine	64.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
White pine	--	--	--	--	--	--	--	12.0	--	--	--	10.0	18.0	--	--
Northern white-cedar	--	--	--	310.0	--	5.2	542.8	44.0	--	65.6	5.2	21.6	48.4	--	--
Hemlock	--	--	--	--	--	--	--	--	--	21.2	15.2	--	--	--	--
Striped maple	--	--	--	--	--	--	--	--	--	--	4.0	--	--	--	--
Red maple	26.8	5.2	77.6	70.4	170.4	22.0	132.4	52.8	5.2	192.8	140.8	52.4	73.2	--	--
Sugar maple	--	--	175.2	32.8	59.6	81.6	46.8	--	150.8	110.0	853.2	158.0	50.4	--	--
Mountain maple	--	--	--	152.8	102.4	--	315.6	--	--	64.8	66.0	41.6	358.4	--	--
Speckled alder	--	--	7.6	955.2	280.8	1,952.4	757.2	2,718.0	--	397.2	38.4	225.6	132.0	--	56.4
Yellow birch	--	--	--	14.4	--	--	8.0	--	--	19.6	29.6	15.6	--	--	--
Paper birch	--	--	--	18.4	37.2	--	39.6	--	7.6	16.0	7.2	4.0	17.6	--	--
Swamp birch	--	--	--	--	--	18.0	--	--	--	--	--	--	--	--	--
American hornbeam	--	--	--	--	--	--	--	--	--	51.6	--	--	--	--	--
Flowering dogwood	--	--	--	--	--	4.4	--	--	--	--	--	--	--	--	--
Other dogwood	--	--	--	16.4	--	50.4	44.0	38.8	--	65.2	--	20.4	--	--	--
Hawthorn	--	--	--	--	--	--	--	--	--	--	--	4.0	--	--	--
White ash	--	--	--	--	--	--	--	--	--	18.4	4.8	28.4	--	--	--
Black ash	--	--	--	71.6	--	--	100.0	--	--	453.6	13.6	--	6.0	--	--
Mountain holly	--	--	--	--	--	4.8	--	--	--	--	--	--	--	--	--
Eastern hophornbeam	--	--	34.8	--	--	--	--	--	289.2	--	16.8	--	--	--	--
Balsam poplar	--	--	--	12.8	--	--	7.2	--	--	--	--	26.0	--	--	--
Bigtooth aspen	--	--	--	--	--	--	--	--	--	--	--	6.0	74.4	--	--
Quaking aspen	--	--	--	--	--	4.4	26.8	--	6.4	22.4	21.6	302.4	72.4	--	--
Pin cherry	--	--	--	--	10.0	--	--	--	--	--	--	4.8	--	--	5.6
Black cherry	63.2	--	21.2	17.2	11.6	4.0	--	--	--	240.4	24.4	24.8	30.4	--	-
Chokecherry	--	--	9.6	13.6	99.6	9.6	--	34.8	--	52.4	7.6	59.2	14.4	--	4.0
Sandcherry	10.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Northern red oak	--	42.4	--	--	--	--	--	--	60.8	10.8	12.0	5.6	29.6	--	--
Sweet gale	--	--	--	--	--	--	26.0	--	--	--	--	--	--	--	--
Mountain ash	--	--	--	--	--	--	--	--	--	10.4	4.8	4.0	--	--	--
Witch hazel	--	--	24.0	--	8.8	--	--	--	--	17.2	9.2	--	--	--	--
Juneberry	74.0	--	68.0	52.4	97.6	18.4	--	837.6	5.2	72.0	10.0	85.2	61.2	--	4.4
Hazel	--	--	446.4	68.8	132.4	--	221.2	96.0	242.8	184.8	192.8	443.6	119.6	--	--
Leatherwood	--	--	--	--	--	--	--	--	--	--	5.2	--	--	--	--
Viburnum	--	--	--	--	--	--	--	--	--	82.0	--	--	--	--	--
Elder	--	--	--	--	--	--	--	--	--	--	16.4	--	--	--	--
Sumac	--	--	--	--	--	--	--	--	--	--	--	4.4	--	--	--
Buffaloberry	--	--	--	--	--	--	--	--	--	--	--	7.6	--	--	--
Willow	--	68.8	5.2	10.8	295.6	6.8	30.4	822.0	--	141.2	10.4	42.0	6.0	--	--
American basswood	--	--	--	--	--	--	--	--	--	8.0	12.0	6.8	--	--	--
American elm	--	--	--	6.0	--	--	--	--	--	18.4	11.6	--	--	--	--
Total	304.0	312.4	1,168.4	2,266.4	1,376.4	2,741.6	2,731.6	5,329.2	1,300.8	2,556.0	1,655.6	1,770.8	1,426.0	--	70.4

(Table 70 continued on next page)

(Table 70 continued)

Shrub species group	Forest type														
	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
LOW SHRUBS															
Yew	--	--	--	11.4	--	--	1.6	--	--	--	1.9	--	--	--	--
Labrador tea	--	--	--	95.8	15.4	228.0	8.4	--	--	3.3	--	--	--	--	--
Leatherleaf	--	--	--	--	--	20.4	--	378.3	--	3.4	--	--	--	--	--
Bog laurel	--	--	--	--	--	3.7	--	--	--	--	--	--	--	--	--
Sweetfern	19.5	1.5	--	--	4.4	--	--	1.2	--	--	--	8.0	--	--	4.8
Gooseberry-currant	--	--	--	--	--	--	4.4	6.2	--	--	--	2.3	--	--	--
Raspberry-blackberry	--	--	52.9	19.0	6.3	4.0	4.8	1.5	--	3.2	22.0	43.7	27.0	--	--
Rose	--	--	--	--	--	--	--	--	--	1.4	--	1.1	--	--	--
Black huckleberry	--	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Bilberry-blueberry	565.8	151.7	46.9	20.6	14.3	113.1	3.0	83.3	2.6	16.8	3.0	18.0	11.2	--	128.3
Bush honeysuckle	--	11.1	16.9	3.6	6.8	--	--	6.9	--	3.7	--	3.1	1.3	--	--
Honeysuckle	--	5.8	2.9	6.2	8.2	3.0	3.8	6.3	--	1.4	5.5	11.6	3.6	--	--
Bearberry	--	11.1	--	--	--	2.8	--	--	--	--	--	--	--	--	--
Bog rosemary	--	--	--	--	--	5.2	--	--	--	--	--	--	--	--	--
Total	585.3	183.7	119.6	156.6	55.4	380.2	26.0	483.7	2.6	33.2	32.4	87.8	43.1	--	133.1
All shrubs	889.3	496.1	1,288.0	2,423.0	1,431.8	3,121.8	2,757.6	5,812.9	1,303.4	2,589.2	1,688.0	1,858.6	1,469.1	--	203.5
Number of plots[2/]	20	8	14	32	84	73	10	13	9	61	834	163	43	--	5

1/Trees under 1.0-inch d.b.h. are also included. Tree and shrub species that averaged less than 1.0 pound per acre are not included.

2/Number of plots by forest type from which average yields were derived.

Table 71.--All live tree biomass yields on commercial forest land by species group and forest type, Western Upper Peninsula, Michigan, 1980

(In pounds per acre)

Shrub species group	Forest type														
	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS															
White pine	1,387	9,814	68,994	3,114	6,207	1,475	1,297	601	3,084	719	1,207	1,550	2,228	--	617
Red pine	4,307	69,184	7,270	763	255	1,336	48	--	6,094	--	42	1,165	870	--	--
Jack pine	89,272	4,262	1,640	256	893	2,581	--	--	--	--	98	779	1,830	3,729	304
White spruce	185	1,013	7,483	10,312	51,651	1,471	2,260	88	730	3,485	1,815	3,346	3,609	--	--
Black spruce	2,216	1,169	3,466	5,385	3,426	36,322	5,952	9,549	1,080	1,444	221	745	1,378	--	813
Balsam fir	761	3,263	23,248	46,619	12,106	9,606	21,739	3,766	3,430	12,866	6,365	9,239	15,957	--	--
Hemlock	--	--	948	1,643	--	344	229	--	--	4,402	10,873	360	784	--	--
Tamarack	--	--	150	1,286	632	6,310	2,147	33,439	--	297	13	390	813	--	--
Northern white-cedar	--	--	879	7,565	3,046	8,613	61,615	3,153	--	9,313	2,266	689	3,858	--	--
Other softwoods	--	183	--	--	--	27	--	--	--	--	5	--	--	15,619	--
Total	98,128	88,888	114,078	76,943	78,216	68,085	95,287	50,596	14,418	32,526	22,905	18,263	31,327	19,348	1,734
HARDWOODS															
Select white oaks	--	--	--	--	--	--	--	--	--	--	--	170	--	--	--
Select red oaks	1,734	2,225	1,888	141	--	--	--	--	100,197	435	2,345	1,669	2,844	--	--
Other red oaks	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yellow birch	--	--	544	3,830	241	1,192	3,400	--	2,411	9,938	16,856	1,139	882	--	--
Hard maple	143	938	7,883	2,283	3,251	209	1,488	--	23,625	7,829	70,745	7,545	9,912	--	49
Soft maple	1,200	2,128	9,757	9,336	3,728	3,145	5,169	368	16,872	24,700	22,163	9,510	15,316	--	--
Beech	--	--	--	--	--	--	--	--	--	--	30	--	--	--	--
Ash	--	--	351	1,331	--	978	2,916	131	589	39,768	3,191	1,366	745	--	--
Balsam poplar	--	115	--	1,385	65	178	1,219	648	--	512	230	2,940	708	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	12	--	--	--
Bigtooth aspen	753	5,113	--	434	--	36	44	--	9,675	42	946	8,139	3,698	--	--
Quaking aspen	5,666	11,318	13,577	8,640	26,753	3,979	1,710	2,205	3,676	3,826	7,042	47,849	10,219	--	1,306
Basswood	--	--	305	57	--	--	--	--	--	1,099	7,253	559	294	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black cherry	240	762	--	1,339	392	242	107	--	--	484	2,141	948	614	--	--
Butternut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	--	--	303	1,265	700	81	206	--	--	7,973	5,486	1,565	286	--	--
Paper birch	608	5,808	19,075	6,910	3,795	3,096	7,250	1,093	6,939	2,977	2,577	7,449	68,893	--	1,289
Other hardwoods	--	93	--	--	--	--	--	--	--	137	37	--	--	--	--
Noncommercial species	77	--	50	148	52	601	380	--	93	230	2,458	527	625	--	--
Total	10,421	28,500	53,733	37,099	38,977	13,737	23,889	4,445	164,077	99,950	143,500	91,387	115,036	--	2,644
All species	108,549	117,388	167,811	114,042	117,193	81,822	119,176	55,041	178,495	132,476	166,405	109,650	146,363	19,348	4,378
Number of plots[1/]	39	22	23	199	21	119	135	22	14	101	1,321	378	79	1	13

[1/] Number of plots by forest type from which average yields were derived.

Table 72.--All live tree biomass on commercial forest land by species group and forest type, Western Upper Peninsula, Michigan, 1980

(In green tons)

Species group	All types	Forest type						
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar
SOFTWOODS								
White pine	5,286,834	61,238	282,646	1,679,994	570,784	126,010	154,523	136,274
Red pine	3,258,078	190,137	1,992,506	177,018	139,819	5,182	139,956	5,073
Jack pine	4,980,396	3,941,355	122,740	39,936	47,005	18,137	270,386	--
White spruce	7,494,408	8,164	29,161	182,209	1,890,265	1,048,514	154,040	237,550
Black spruce	6,655,403	97,848	33,661	84,402	987,167	69,538	3,804,701	625,511
Balsam fir	26,059,064	33,600	93,977	566,098	8,545,280	245,761	1,006,223	2,284,829
Hemlock	13,844,227	--	--	23,081	301,204	--	36,024	24,102
Tamarack	1,982,235	--	--	3,653	235,743	12,829	661,010	225,635
Northern white-cedar	12,912,836	--	--	21,399	1,386,592	61,838	902,177	6,475,751
Other softwoods	26,568	--	5,275	--	--	--	2,834	--
Total	82,500,049	4,332,342	2,559,966	2,777,790	14,103,859	1,587,809	7,131,874	10,014,725
HARDWOODS								
Select white oaks	62,148	--	--	--	--	--	--	--
Select red oaks	4,979,212	76,562	64,073	45,974	25,877	--	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	22,549,510	--	--	13,256	702,119	4,888	124,858	357,362
Hard maple	89,220,135	6,331	27,010	191,951	418,526	65,996	21,905	156,442
Soft maple	36,183,842	52,992	61,291	237,590	1,711,380	75,674	329,470	543,225
Beech	35,997	--	--	--	--	--	--	--
Ash	8,384,754	--	--	8,542	244,004	--	102,451	306,509
Balsam poplar	1,862,639	--	3,317	--	253,880	1,325	18,605	128,168
Cottonwood	4,244	--	--	--	--	--	--	--
Bigtooth aspen	4,754,106	33,258	147,253	--	79,626	--	3,788	4,668
Quaking aspen	30,686,466	250,149	325,971	330,589	1,583,673	543,082	416,787	179,675
Basswood	8,941,629	--	--	7,431	10,503	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	3,295,562	10,579	21,949	--	245,501	7,967	25,340	11,269
Butternut	--	--	--	--	--	--	--	--
Elm	8,062,100	--	--	7,377	231,899	14,211	8,520	21,682
Paper birch	14,199,168	26,845	167,283	464,484	1,266,587	77,042	324,270	762,029
Other hardwoods	57,868	--	2,681	--	--	--	--	--
Noncommercial species	3,309,778	3,407	--	1,206	27,071	1,047	62,914	39,917
Total	236,589,158	460,123	820,828	1,308,400	6,800,646	791,232	1,438,908	2,510,946
All species	319,089,207	4,792,465	3,380,794	4,086,190	20,904,505	2,379,041	8,570,782	12,525,671

(Table 72 continued on next page)

(Table 72 continued)

Species group	Forest type							
	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
SOFTWOODS								
White pine	10,819	34,849	61,030	1,431,461	568,191	160,158	--	8,857
Red pine	--	68,867	--	49,899	427,078	62,543	--	--
Jack pine	--	--	--	116,310	285,586	131,598	2,983	4,360
White spruce	1,578	8,246	295,679	2,152,745	1,226,795	259,462	--	--
Black spruce	171,881	12,199	122,521	262,255	272,995	99,053	--	11,671
Balsam fir	67,783	38,763	1,091,675	7,550,183	3,387,585	1,147,307	--	--
Hemlock	--	--	373,472	12,897,859	132,147	56,338	--	--
Tamarack	601,895	--	25,207	14,948	142,846	58,469	--	--
Northern white-cedar	56,751	--	790,175	2,687,991	252,768	277,394	--	--
Other softwoods	--	--	--	5,964	--	--	12,495	--
Total	910,707	162,924	2,759,759	27,169,615	6,695,991	2,252,322	15,478	24,888
HARDWOODS								
Select white oaks	--	--	--	--	62,148	--	--	--
Select red oaks	--	1,132,224	36,878	2,781,149	612,018	204,457	--	--
Other red oaks	--	--	--	--	--	--	--	--
Hickory	--	--	--	--	--	--	--	--
Yellow birch	--	27,243	843,278	19,995,541	417,543	63,422	--	--
Hard maple	--	266,959	664,292	83,920,940	2,766,368	712,705	--	710
Soft maple	6,627	190,649	2,095,816	26,290,929	3,486,951	1,101,248	--	--
Beech	--	--	--	35,997	--	--	--	--
Ash	2,351	6,654	3,374,330	3,785,548	500,820	53,545	--	--
Balsam poplar	11,671	--	43,476	273,183	1,078,117	50,897	--	--
Cottonwood	--	--	--	--	4,244	--	--	--
Bigtooth aspen	--	109,327	3,533	1,122,665	2,984,137	265,851	--	--
Quaking aspen	39,692	41,537	324,645	8,353,366	17,543,834	734,724	--	18,742
Basswood	--	--	93,290	8,604,305	204,983	21,117	--	--
Yellow-poplar	--	--	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--	--	--
Black cherry	--	--	41,046	2,540,326	347,447	44,138	--	--
Butternut	--	--	--	--	--	--	--	--
Elm	--	--	676,549	6,507,473	573,802	20,587	--	--
Paper birch	19,670	78,410	252,592	3,056,762	2,731,291	4,953,411	--	18,492
Other hardwoods	--	--	11,612	43,575	--	--	--	--
Noncommercial species	--	1,052	19,479	2,915,555	193,164	44,966	--	--
Total	80,011	1,854,055	8,480,816	170,227,314	33,506,867	8,271,068	--	37,944
All species	990,718	2,016,979	11,240,575	197,396,929	40,202,858	10,523,390	15,478	62,832

Table 73.--All live tree biomass by species group and tree biomass component, Western Upper Peninsula, Michigan, 1980

Species group	All components	Biomass component				
		1-to 5-inch trees	Growing stock		Cull	
			Boles	Tops and limbs	Boles	Tops and limbs
		-Green tons-				
SOFTWOODS						
White pine	5,286,834	127,464	3,441,508	1,563,551	93,959	60,352
Red pine	3,258,078	527,215	1,862,560	837,629	18,633	12,041
Jack pine	4,980,396	407,183	3,073,439	1,398,212	62,149	39,413
White spruce	7,494,408	1,311,025	4,139,174	1,951,885	53,550	38,774
Black spruce	6,655,403	2,890,867	2,536,294	1,184,575	25,362	18,305
Balsam fir	26,059,064	10,536,330	10,367,536	4,804,037	208,943	142,218
Hemlock	13,844,227	537,966	8,314,780	3,789,459	733,264	468,758
Tamarack	1,982,235	570,408	893,070	431,047	43,512	44,198
Northern white-cedar	12,912,836	2,849,899	5,450,125	2,703,626	1,028,712	880,474
Other softwoods	26,568	12,495	8,104	3,673	1,194	1,102
Total	82,500,049	19,770,852	40,086,590	18,667,694	2,269,278	1,705,635
HARDWOODS						
Select white oaks	62,148	--	27,907	13,355	13,715	7,171
Select red oaks	4,979,212	248,733	3,012,604	1,383,794	204,704	129,377
Other red oaks	--	--	--	--	--	--
Hickory	--	--	--	--	--	--
Yellow birch	22,549,510	2,201,162	10,397,103	4,973,163	2,814,435	2,163,647
Hard maple	89,220,135	16,215,427	44,706,352	21,011,074	4,448,251	2,839,031
Soft maple	36,183,842	7,182,064	17,374,435	8,299,622	1,979,117	1,348,604
Beech	35,997	1,311	14,897	6,883	7,867	5,039
Ash	8,384,754	2,203,031	3,943,263	1,796,957	260,948	180,555
Balsam poplar	1,862,639	246,118	1,058,582	507,159	29,071	21,709
Cottonwood	4,244	--	2,338	1,906	--	--
Bigtooth aspen	4,754,106	241,116	2,733,194	1,245,795	317,481	216,520
Quaking aspen	30,686,466	3,126,219	16,397,150	7,642,943	2,070,126	1,450,028
Basswood	8,941,629	744,481	5,301,552	2,347,069	329,719	218,808
Yellow-poplar	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--
Black cherry	3,295,562	623,872	1,503,761	686,950	295,746	185,233
Butternut	--	--	--	--	--	--
Elm	8,062,100	835,801	4,601,754	2,118,523	326,123	179,899
Paper birch	14,199,168	1,436,690	7,943,780	3,737,960	658,769	421,969
Other hardwoods	57,868	14,301	5,086	2,343	22,671	13,467
Noncommercial species	3,309,778	1,853,620	--	--	948,519	507,639
Total	236,589,158	37,173,946	119,023,758	55,775,496	14,727,262	9,888,696
All species	319,089,207	56,944,798	159,110,348	74,443,190	16,996,540	11,594,331

(Table 73 continued on next page)

(Table 73 continued)

Species group	All components	Biomass component				
		1-to 5-inch trees	Growing stock		Cull	
			Boles	Tops and limbs	Boles	Tops and limbs
			Thousand cubic feet			
SOFTWOODS						
White pine	292,146	7,052	190,184	86,404	5,180	3,326
Red pine	158,591	25,562	90,721	40,799	916	593
Jack pine	209,474	16,949	129,331	58,842	2,661	1,691
White spruce	425,261	74,279	234,963	110,800	3,029	2,190
Black spruce	407,382	176,541	155,547	72,649	1,539	1,106
Balsam fir	1,189,138	481,111	472,737	219,056	9,637	6,597
Hemlock	584,706	22,392	350,531	159,787	31,613	20,383
Tamarack	86,588	25,073	38,837	18,745	1,937	1,996
Northern white-cedar	882,671	194,201	374,884	185,972	68,971	58,643
Other softwoods	1,304	593	403	183	65	60
Total	4,237,261	1,023,753	2,038,138	953,237	125,548	96,585
HARDWOODS						
Select white oaks	2,212	--	990	473	492	257
Select red oaks	174,339	8,540	105,360	48,400	7,341	4,698
Other red oaks	--	--	--	--	--	--
Hickory	--	--	--	--	--	--
Yellow birch	847,495	81,525	388,183	185,720	108,245	83,822
Hard maple	3,384,326	610,176	1,695,220	796,720	171,979	110,231
Soft maple	1,567,902	309,906	752,305	359,387	86,893	59,411
Beech	1,412	51	581	268	312	200
Ash	339,598	87,945	160,150	72,981	10,833	7,689
Balsam poplar	94,556	12,446	53,750	25,752	1,490	1,118
Cottonwood	186	--	102	84	--	--
Bigtooth aspen	227,774	11,455	130,797	59,620	15,388	10,514
Quaking aspen	1,465,085	148,514	782,060	364,541	99,886	70,084
Basswood	445,285	36,856	263,952	116,859	16,570	11,048
Yellow-poplar	--	--	--	--	--	--
Black walnut	--	--	--	--	--	--
Black cherry	149,617	27,945	68,232	31,175	13,623	8,642
Butternut	--	--	--	--	--	--
Elm	316,412	32,490	180,661	83,170	12,922	7,169
Paper birch	590,602	59,800	330,020	155,290	27,691	17,801
Other hardwoods	2,427	595	213	98	954	567
Noncommercial species	139,339	77,154	--	--	40,496	21,689
Total	9,748,567	1,505,398	4,912,576	2,300,538	615,115	414,940
All species	13,985,828	2,529,151	6,950,714	3,253,775	740,663	511,525

Table 74.--Sampling errors[1/] for estimates smaller than the Unit totals of volume, net growth, removals, and area of commercial forest land, Western Upper Peninsula, Michigan, 1980

Sampling error	Commercial forest area	Growing Stock			Sawtimber		
		Inventory	Growth	Removals	Inventory	Growth	Removals
Percent	Thousand acres	Million cubic feet			[2/]Million board feet		
1	972.9	5,631.5	429.1	13,257.9	39,389.7	6,615.0	61,065.1
2	243.2	1,407.9	107.3	3,314.5	9,847.4	1,653.8	15,266.3
3	108.1	625.7	47.7	1,473.1	4,376.6	735.0	6,785.0
4	60.8	352.0	26.8	828.6	2,461.9	413.4	3,816.6
5	38.9	225.3	17.2	530.3	1,575.6	264.6	2,442.6
10	9.7	56.3	4.3	132.6	393.9	66.2	610.7
15	4.3	25.0	1.9	58.9	175.1	29.4	271.4
20	2.4	14.1	1.1	33.1	98.5	16.5	152.7
25	1.6	9.0	0.7	21.2	63.0	10.6	97.7
50	0.4	2.3	0.2	5.3	15.8	2.6	24.4
100	0.1	0.6	0.0	1.3	3.9	0.7	6.1

[1/]At the 68-percent probability level.
[2/]International 1/4-inch rule.

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The fourth inventory of the timber resource of Michigan's Western Upper Peninsula Survey Unit shows an 8-percent decline in commercial forest area and a 22-percent gain in growing-stock volume between 1966 and 1980. Presented are highlights and statistics on area, volume, growth, mortality, removals, utilization, and biomass.

KEY WORDS: Timber resource, statistics, area, volume, growth, mortality, removals.